TRANSCRIPT OF RECORD.

SUPREME COURT OF THE UNITED STATES.

OCTOBER TERM, 1894.

No. 240.

JOHN E. DU BOIS, APPELLANT,

vs.

ARTHUR KIRK.

APPEAL FROM THE CIRCUIT COURT OF THE UNITED STATES FOR THE WESTERN DISTRICT OF PENNSYLVANIA.

FILED JULY 24, 1894.

(14,706.)

(14,756.)

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1 Among the rolls, records, and judicial proceedings had in the circuit court of the United States in and for the western district of Pennsylvania, entered at No. 39, November term, 1886, wherein Arthur Kirk is complainant and John E. Du Bois is defendant, the following may be found as matter of record and on file:

Equity Docket Entries.

November Term, 1886.

ARTHUR KIRK
vs.
JOHN E. DU BOIS. } No. 39.

Bakewell & Kerr, W. L. Pierce, Jan. 8, '89.
T. H. B. Patterson.

Bill filed October 4, 1886. Same day, subpœna issued. Returnable first Monday of November next.

1886, Oct. 5.—Upon motion of complainant's solicitors, order granting leave to complainant to move for a preliminary injunction and fixing Oct. 27 for hearing thereon. Defendant's affidavits to be filed on or before Oct. 23, 1886, and notice of motion for injunction issued. Same day, complainant's affidavit in support of said motion filed.

1886, Oct. 5.—Subpœna and notice of motion for injunction served on defendant by acceptance of service by Geo. A. Jenks, Esq., his counsel. [illegible] Mar., $5.06.

1886, Nov. 3.—Affidavits of James Stedeford, R. N. Spohn, Wm. Bentley, Arthur Kirk, and A. H. Trimble on part of complainants, on motion for preliminary injunction, also copy letter from Kirk to Du Bois, filed on part of complainant. Same day, affidavits of G. W. Edwards, C. T. Fuller, John Horner, and W. R. Gray filed. Same day, aff't of Chas. Loring, C. T. Fuller, and John E. Du Bois on part of defendant filed. Same day, answer of John E. Du Bois filed; also exhibits filed.

1886, Nov. 8.—Motion for injunction denied.

1886, Dec. 4.—Replication filed.

1887, Jan'y 18.—Stipulation of counsel filed extending defendant's time for closing testimony until March 20, 1887, and complainant's rebutting testimony until first Monday of May, 1887.

1887, April 19.—Complainant's sol'rs move the court for the appointment of Schuyler Duryer, Esq., at Washington, D. C.;
2 Charles B. Germain, at Buffalo, New York; Wm. H. Bradley, at Chicago, Ill., and W. B. Corwin, at Pittsburgh, Pa., and order granted appointing them as special examiners herein. Same day, answer to motion for appointment of examiners filed. Same day, certificates of appointment issued to appointees.

1887, April 27.—Order granted appointing S. A. Burnham, Esq., examiner on part of complainant at Chicago. Same day, certificate of appointment issued.

1887, April 30.—Order granted extending complainant's time for taking rebutting testimony filed.

1887, May 4.—Deposition of F. W. Ritter, on part of complainant, in rebuttal, before S. Duryee, Esq., at Washington, D. C., together with Exhibit Ritter, filed.

1887, May 5.—Order granted extending time for taking testimony in rebuttal, on behalf of complainant, until May 28, 1887, filed.

1887, May 13.—Order granted appointing Charles J. Ferlong special examiner at Buffalo, N. Y., on part of complainant, filed. Same day, certificate of appointment issued.

1887, May 19.—Complainant's rebutting testimony, taken before Chas. B. Germain, sp'l ex'r, at Buffalo, N. Y., filed.

1887, June 9.—Testimony on part of complainant, in rebuttal, taken before S. W. Burnham, sp'l examiner, at Chicago, Ill., filed.

1887, June 15.—On motion of complainant's counsel, order granted directing defendant to close his testimony in 15 days from this date, the testimony to be taken at Chicago and Washington, to be upon written interrogatories and cross-interrogatories.

1887, June 17.—Order granted appointing Truman Ames, Esq., notary public at Du Bois, Pa., and W. B. Corwin, Esq., of Pittsburgh, Pa., special examiners on part of defendant, filed. Same day, certificates issued to appointees.

1887, June 24.—Cross-interrogatories directed to F. W. Riter, at Washington, D. C., filed. Same day, motion to strike out the direct examination of F. W. Riter and nominating Schuyler Duryee, Esq., as commissioner to take said Riter's deposition, subject to foregoing motion, filed.

1887, June 25.—Cross-interrogatories to be addressed to Edwin T. Buegler before S. A. Burnham, examiner, at Chicago, Ill., filed. Same day, commission, with interrogatories attached, mailed to above commissioner. Also, commission, with interrogatories, issued to Schuyler Duryee, at Washington, D. C.

3 1887, July 1.—Deposition of F. W. Riter, Esq., taken before Schuyler Duryee, Esq., on cross-interrogatories filed by defendant, filed.

1887, July 2.—Objections to cross-interrogatories directed to F. A. Riter and E. T. Buegler filed.

1887, July 7.—Rule and interrogatories directed to S. W. Burnham, Esq., returned unexecuted.

1887, July 8.—Rule with cross-interrogatories, addressed to E. T. Bengler, issued to Joseph G. Hirschbeck, Esq., at Buffalo, N. Y.

1887, July 15.—Deposition of E. T. Beugler taken on commission issued to J. G. Hirschbeck, at Buffalo, N. Y., filed

1887, July 19.—Testimony on behalf of complainant taken by W. B. Corwin filed.

1887, July 27.—Complainant's Exhibits "Kirk Caveat," "Kirk Tile Wrapper & Contents," "Certified Copy of Interference Record," "Kirk Sketch A," and "Kirk Map," filed.

1887, Dec. 10.—Testimony on part of respondent taken before W. B. Corwin, notary public, filed; also testimony on part of re-

spondent, taken before Turman Ames, Esq., notary public and special examiner, at Du Bois, Pa., filed.

1887, Dec. 12.—Case called for final hearing and arguments proceeded with.

1887, Dec. 13.—Arguments proceeds. Dec. 14.—Arguments concluded. C. A. V.

1887, Dec. 27.—Opinion of the court awarding a decree for complainant filed.

1887, Dec. 28.—Motion made by defendant for a reargument of cause.

1887, Dec. 29.—Motion for reargument denied.

1887, Dec. 31.—Decree entered sustaining patent in suit, decreeing defendant to have infringed the sixth claim thereof, awarding a perpetual injunction against defendant, and appointing Smith H. Shannon, Esq., master to take an account filed. Same day, certificate issued to master. Same day, injunction issued.

1888, Jan'y 3.—Injunction served. Mar., $10.30.

1890, June 3.—Upon motion of compl't's sol'r rule granted upon the master to show cause why he should not file his report within 15 days from date, returnable forthwith. Proof of service on master endorsed thereon.

1890, July 7.—Master's report, with testimony and exhibits offered before him, filed Same day, exceptions on part of compl'ts and defendants filed before the master filed.

1890, July 8.—Renewal of exceptions to master's report on part of compl't filed.

4 Aug. 6, 1890.—Additional exceptions filed by def't, and on July 29, def't- exceptions before master renewed.

1890, Oct. 23.—Order made upon petition of master to have his fee fixed, fixing the same at the sum of $750.00. Order filed.

1890, Dec. 8.—Hearing fixed for Jan'y 6, 1891.

1891, January 6.—Hearing adjourned.

1891, January 23.—Cause argued in part upon master's report. January 24.—Argument continued. January 26.—Argument concluded. C. A. V.

1891, Jan. 23.—Requests for findings on part of defendant filed.

1891, March 21.—Opinion of the court on exceptions to master's report, with order directing a decree to be drawn in accordance with the master's report, filed.

1891, May 9.—Decree granted confirming master's report, making decree entered on Dec. 31, 1887, final; that defendant pay to complainant the sum of six cents' damages, and that complainant have execution for such sum, together with costs of suit, to be taxed by the clerk, filed.

1891, June 26.—Petition of John E. Du Bois, praying for an appeal from the decree herein to the Supreme Court of the U. S., with bond in the sum of four thousand dollars, with W. T. Wallace as surety, presented to the Hon. Marcus W. Acheson, circuit judge, and the bond approved and appeal allowed and citation issued, returnable in said Supreme Court within thirty days. Same day, assignments of error presented with petition for appeal and filed.

1891, June 30.—Petition of Arthur Kirk, praying for the allowance of a cross-appeal from the decree herein to the Supreme Court of the United States, with bond in the sum of $500, with John L. Kirk as surety, presented to the Hon. M. W. Acheson, cir. J., at Phila., Pa., and the bond is approved and cross-appeal allowed and citation issued, returnable in U. S. Supreme Court within thirty days. Same day, assignments of error presented with the petition for appeal and filed.

1891, June 27.—Service of citation on Du Bois' appeal accepted by W. Bakewell & Sons, sol'rs for A. Kirk.

1891, July 14.—Service of citation on cross-appeal of A. Kirk accepted by T. H. Baird Patterson and Geo. A. Jenks, Esq's, sol'rs for Du Bois.

5 In the United States Circuit Court for the Western District of Pennsylvania.

No. 39, November Term, 1886.

ARTHUR KIRK
versus
JOHN E. DU BOIS. } In Equity.

Bill.

To the honorable the judges of the circuit court of the United States in and for the western district of Pa.:

Arthur Kirk, a resident of the city of Pittsburgh, in the county of Allegheny, and State of Pennsylvania, and a citizen of said State, brings this bill against John E. Du Bois, a resident of Du Bois, Clearfield county, in the State of Pennsylvania, and a citizen of said State.

And thereupon your orator complains and says that on or before the 31st day of May in the year one thousand eight hundred and eighty-one, Arthur Kirk, the complainant above named, was the true, original and first inventor of a certain new and useful improvement in movable dams, not known or used before, and

6 not in public use or on sale for more than two years prior to the date of his application for a patent.

And your orator further shows unto your honors that the said Arthur Kirk, the complainant, so being the inventor of said improvement, and being a citizen of the United States aforesaid, made application to the proper department of the Government of the United States for letters patent, in accordance with the then existing laws of Congress; and having duly complied in all respects with the conditions and requisitions of said laws, on the 5th day of December, in the year one thousand eight hundred and eighty-two, letters patent of the United States, No. 258,411 signed, sealed and executed in due form of law, for his said invention or discovery, were issued to the aforesaid Arthur Kirk, whereby there was secured to him and to his heirs, executors and assigns, for the term of seventeen years from the fifth day of December, in the year one thousand

eight hundred and eighty-two, the full and exclusive right of making, using and vending to others to be used, the said improvement.

And your orator further shows, that a description or specification of the aforesaid improvement was given in the schedule to the aforesaid letters patent annexed, accompanied by certain drawings, referred to in said last-mentioned schedule, and forming part of said letters patent. The said letters patent, and the said specifications thereto annexed (which, or an exemplified copy of which, your orator will produce, as your honors may direct,) were duly recorded in the Patent Office.

And your orator further shows that he has been, and but for the infringement hereinafter complained of, your orator, the said patentee, would still be in the undisturbed possession, use and enjoyment of the exclusive privileges secured by the said letters patent, and in receipt of the profits of the same.

7 And your orator further shows unto your honors, as he is informed and believes, that the said defendant herein named, well knowing all the facts hereinbefore set forth, is now constructing and using within the western district of Pennsylvania movable dams, in some parts thereof substantially the same in construction and operation as in the said complainant's letters patent mentioned, the exclusive right and privilege to make and use which, and vend the same to others to be used, is thus by law vested in your orator.

And so it is, may it please your honors, that the said defendant, as your orator is informed and believes, without the license of your orator, against his will and in violation of his rights, has made and used, and intends to continue still to make and use the said improvements within the western district of Pennsylvania, and refuses to pay to your orator any of the profits which he has made by such unlawful manufacture and use, or to desist from the further infringement of said recited letters patent; all of which acts and doings are in violation of the exclusive rights and privileges, so as aforesaid vested in your orator under and by virtue of said recited letters patent and are contrary to equity and good conscience, and tend to the manifest injury of your orator in the premises.

To the end, therefore, that the defendant may, if he can, show reason why your orator should not have the relief hereby prayed, and that he may make a full disclosure and discovery of all the matters aforesaid, and upon his corporal oath, and according to the best and utmost of his knowledge, remembrance, information and belief, full, true, direct and perfect answer make to the matters and things hereinbefore stated and charged; and particularly to such of the several interrogatories hereinafter numbered and set forth as by the note hereunder written they are required to answer, that is to say:

I. Whether the said letters patent No. 268,411 herebefore mentioned, were granted and issued to the complainant, Arthur Kirk, on the 5th day of December, 1882, as aforesaid?

8 II. Whether the said defendant, has at any time, and when and during what period of time, made, used or sold any and

how many movable dams, constructed in whole or in part, upon the principles and in the manner described in said letters patent No. 268,411, granted to the said complainant as aforesaid? Describe minutely and in detail their construction and operation.

And that the said defendant may answer the premises, and that he may be decreed to account for and pay over the income or profits thus unlawfully derived or which might have been derived from the violation of the rights of your orator, as aforesaid, your orator prays that your honors, upon entering of the decree in favor of your orator against said defendant for infringement, as above prayed for, may also proceed to assess, or cause to be assessed, under your directions, as well the profits or income to be derived therefrom, to be accounted for as aforesaid, as also, in addition thereto, the damages sustained by your orator by reason of such infringements, and that your honors may increase the actual damages so assessed to a sum equal to three times the amount of such assessment, under the circumstances of the willful and unjust infringement committed by said defendant as hereinbefore set forth; and further, that the said defendant may be restrained from any further violation of the rights of your orator as aforesaid, your orator prays that your honors may grant a writ of injunction issuing from, and under the seal of this honorable court, or issued by one of your honors, perpetually enjoining and restraining the said defendant, his clerks, attorneys, servants, agents and workmen, from any further construction or sale, or use in any manner of said patented improvements, or any part thereof, in violation of the rights of your orator as aforesaid, and that the parts of the movable dams which infringe said patent, and which are now in possession or use of the said defendant may be destroyed, or delivered up to your orator for that purpose.

9 And your orator further prays that a provisional or preliminary injunction be issued, restraining the said defendant from any further infringement of said recited letters patent, pending this cause, and they pray for such other relief as the equity of the case may require, and to your honors may seem meet.

May it please your honors to grant unto your orator not only a writ of injunction conformable to the prayer of this bill, but also a writ of subpœna of the United States of America, directed to the said John E. Du Bois, commanding him on a day certain therein to be named, to appear and answer unto this bill of complaint, and to abide and perform such order and decree in the premises as to the court shall seem meet, and may be required by the principles of equity and good conscience.

ARTHUR KIRK.

BAKEWELL & KERR,
Solicitors for Complainant.

NOTE.—The defendant is required to answer each of the foregoing interrogatories numbered I to II inclusive.

BAKEWELL & KERR,
Solicitors for Complainant.

10 *Chancery Subpœna.*

UNITED STATES OF AMERICA,
Western District of Pennsylvania.

The United States of America to John E. Du Bois, Greeting:

We command you and every of you that you appear before our judges of our circuit court of the United States of America for the western district of Pennsylvania, at the city of Pittsburgh, in said district, on the first Monday of November next, to answer the bill of complaint of Authur Kirk for infringement of letters patent, filed in the clerk's office of said court in the city of Pittsburgh, then and there to receive and abide by such judgment and decree as shall then or thereafter be made, upon pain of judgement being pronounced against you by default; and this you are in nowise to omit under such penalties as are inflicted by the laws of the United States.

Witness the Hon. Morrison R. Waite, Chief Justice of the Supreme Court of the United States of America, at the city of Pitts-
[SEAL.] burgh aforesaid, this 4th day of October, in the year of our Lord one thousand eight hundred and eighty-six, and of our Independence the 111th.

H. D. GAMBLE, *Clerk.*

MEMORANDUM.—The above-named defendant is required to enter an appearance in the above-entitled cause on or before the first Monday of the month ensuing, twenty days after the service of this writ; otherwise the complaint may be taken against him as confessed and a decree entered accordingly.

H. D. GAMBLE, *Clerk.*

Service accepted Oct. 5th, 1886.

G. A. JENKS,
Att'y for J. E. Du Bois.

And now, Oct. 5th, 1886, service accepted for John E. Dubois, by his att'y, Geo. A. Jenks, as per endorsement on this writ. So ans.—

GEO. W. MILLER,
U. S. Marshal,
Per W. B. CHAMBERS, *Deputy.*

Marshal's Fees.

Service & copy.....	$2 50
Mileage	06
	$2 56

11 In the United States Circuit Court for the Western District of Pennsylvania.

ARTHUR KIRK *vs.* JOHN E. DU BOIS, Grantee and Devisee of John Du Bois, Deceased.	No. 39. November Term, 1886. In Equity.

Answer.

The answer of John E. Du Bois, grantee and devisee of John Du Bois, defendant to the bill of complaint of Arthur Kirk, complainant, still alleging and protesting that the whole cause of action of complainant in this court legally died with John
12 Du Bois, defendant's decedent, this defendant at all times saving and reserving unto himself all benefit and advantage of exception that can or may be had to the many errors, uncertainties, insufficiencies and imperfections in said bill of complaint contained for answer thereto or unto so much thereof as he is advised is material or necessary for him to make answer, answering says:

First. Your defendant denies that Arthur Kirk is the true, original and first inventor of a certain new and useful improvement in movable dams not known or used before, as claimed by his bill of complaint, and avers in response to said allegation that the true facts are as follows:

Your defendant's deceased uncle, John Du Bois, for about twenty-four years past was engaged in building, using and improving movable dams for controlling water in streams used in floating logs and other kinds of navigation. His first patent thereon, No. 36342, was issued September 2d, 1862, and from that time until his death he was constantly inventing, experimenting with and patenting devices for perfecting what is known as the "Du Bois dam." That from that date all or nearly all dams built by him used a fore bay, open at the top, so that the water flowed over the lower end wall when its height was reached. In 1878, or the earlier part of 1879, he built on his property, in Clearfield county, Pennsylvania, in the creek near and above his saw-mills, at the town of Du Bois, one or more of his improved dams, in which the water passed under the dam from a fore bay or chamber, which communicated with the stream or pool above, and which had its lower end wall reduced and reducible in height (substantially as shown in "Kirk Exhibit No. 2," filed with complainant's bill and in complainant's sketches and model heretofore produced in court), at No. 15, May term, 1886, so that the dam would remain down or stop at the desired level. These dams were seen and known by Sydney Fuller and others still living (including, I believe, the complainant), and were openly and successfully used and operated by his said deceased uncle in his
13 business up to the time of his death, and can still be seen without change or alteration, and all the devices therein used are the inventions of said John Du Bois; that the complainant, Arthur Kirk, who for some time had been examining and advocat-

ing the Du Bois dam for adoption by the Government and public generally, in the year 1880, or in the fore part of 1881, visited Du Bois, Pennsylvania, to examine said dams with all the latest improvements and inventions thereon, and while there said dams were fully exhibited and explained to him by said John Du Bois in the presence of Sydney Fuller and others, said Kirk in that conversation suggested a modification or improvement, consisting in making an opening or outlet through one of the side walls, as in his "Exhibit Kirk Sketch No. 1," attached to affidavit filed with bill, at No. 15, May term, 1886, so that after the dam had risen above said opening the current or surplus water flowing constantly under the dam could escape through the opening to the stream below and thus limit the upward pressure under the dam. He proposed no other plan, and was told by said John Du Bois, deceased, that his plan was useless, objectionable and impracticable, and was shown how much more advantageous Mr. Du Bois' own inprovement was as then in use on the dams they were examining. After full experiments therewith, being satisfied of its usefulness, Mr. John Du Bois, April 19th, 1881, made application for letters patent for his aforesaid fore-bay improvement on his dam, having the overflow wall adjustable in height, so that the level of the water could be changed before it reached or passed beneath the dam, according to the height at which the dam was from time to time to be used. By reason of the too broad wording of one of its claims this application was placed in interference with an application of Arthur Kirk, the complainant. After testimony and evidence showing that Kirk only claimed an elevated overflow or outlet to allow the water which was already under the dam to escape, when it had reached a fixed height, as previously described by him to Du Bois, and which Du Bois considered no improvement, but useless and impracticable, and in no way affecting Du Bois' prior invention
14 and improvement in the fore bay, said John Du Bois modified his application by making a new one, omitting objectionable wording, and was recognized by the Patent Office authorities as the first and only person to control the level of the water and height of the dam at a point in advance of the dam by his invention and improvement in the fore bay for which letters patent were issued to him, No. 251,771, on January 3d, 1882 (already filed in case aforesaid, as "Exhibit C," attached to affidavit of John — Bois), nearly one year before complainant's letters patent were claimed to have been issued at No. 268,411, dated December 5th, 1882, which said letters patent, No. 251,771, in connection with his other patents therein mentioned and made part thereof, cover all devices and constructions ever used by said John Du Bois (who was the true, original and first inventor and first used of all same), or by John E. Du Bois, the defendant, the grantee and devisee of said John Du Bois, deceased.

Second. Your defendant, except as hereinbefore set forth and as imperfectly and insufficiently alleged in bill of complaint, is not informed when, if ever, said Arthur Kirk made any such alleged

invention or improvement in movable dams, nor what the extent and exact character and limitation thereof are, nor whether the application for, and issue of, said letters patent and all proceedings therein were in due compliance with law, but is informed and believes, and expects to prove the contrary, and therefore denies each and every material allegation in such behalf contained or implied in said bill of complaint, and this defendant calls upon complainant to make full and sufficient proof thereof. And your defendant denies that any full and exclusive right of using, and vending to others to be used, of the said alleged improvement was thereby secured to said Arthur Kirk or to his heirs or executors as alleged in bill of complaint; and defendant alleges in response to said allegations the facts hereinbefore set forth, and avers that if said letters patent of complainant are limited to the extent of aforesaid "Exhibit No. 1" then same are invalid and void, and no in-
15 vention or improvement and useless, impracticable and frivolous, and that if same, by any method of construction, can be claimed to extend so as to in terms apparently include aforesaid "Exhibit No. 2," then same are invalid and void, by reason of the prior invention and use thereof by John Du Bois, defendant's deceased uncle, and by reason of any such extension or effect thereof having been obtained and accomplished by misrepresentation and fraud.

Third. Your defendant denies that his said deceased uncle, John Du Bois, or himself, as grantee or devisee, said decedent ever made, used or sold, or are now making, using or selling, or intend to make use of or sell substantially and such improvement in movable dams as described and claimed in said claimed letters patent No. 268,411; and further denies that he has violated or infringed any exclusive right or rights which are or can be vested in complainant by virtue of said letters patent, or that he intended or threatened so to do.

Fourth. Your defendant denies that said alleged improvements of complainant in movable dams were new and useful, or that same ever were or could be applied or put to practical use, or that he ever was or could be in the undisturbed possession, use and enjoyment of the exclusive privilege secured by the said letters patent and in receipt of the profits of the same.

Fifth. Your defendant further answering denies each and every the allegations in said bill of complaint contained not hereinbefore specified, admitted or denied.

Sixth. Your defendant further answering says that as to the several interrogatories mentioned and set forth in complainant's bill of complaint that in so far as he can be required to make answer thereunto, he has hereinbefore made full and sufficient answer.

Seventh. All of which matters and things this defendant is ready and willing to aver, maintain and prove as this honorable
16 court shall direct, and respectfully prays to be hence dismissed with his reasonable costs and charges in this behalf most wrongfully sustained.

JOHN E. DU BOIS.

17 Circuit Court of the United States, Western District of Penna.

ARTHUR KIRK
versus
JOHN E. DU BOIS. } No. 39 of November Term, 1886. In Equity.

The replication of the complainant, Arthur Kirk, to the answer of the defendant, John E. Du Bois.

This repliant, saving and reserving to himself all and all manner of advantage of exception to the manifold insufficiencies of the said answer, for replication thereto says that he will aver and prove his said bill to be true, certain, and sufficient in the law to be answered unto, and that the said answer of the said defendant is uncertain, insufficient, and untrue; without this, that any other matter or thing whatever in the said answer contained material or effectual in the law to be replied unto, confessed and avoided, traversed and denied, is true; all of which matters and things this repliant is and will be ready to aver and prove as this honorable court shall direct, and humbly prays as in and by his said bill he has already prayed.

BAKEWELL & KERR,
Solicitors for Complainants.

Filed Dec. 4, 1886.
H. D. GAMBLE, *Clerk.*

18 *Order Appointing Special Examiners.*

In the Circuit Court of the United States for the Western District of Pennsylvania, November Term, 1886.

ARTHUR KIRK
vs.
JOHN E. DU BOIS. } No. 39, In Equity.

And now, this 19th day of April, 1887, the following are appointed special examiners to take and report testimony and other evidence on the part of complainant in the above-entitled cause, to wit:

Schuyler Duryee, Esq., a notary public, whose office is at the Patent Office in Washington, D. C.

Charles B. Germain, clerk of the U. S. district court at Buffalo, New York.

Wm. H. Bradley, Esq., clerk of the U. S. circuit court at Chicago, Illinois.

W. B. Corwin, Esq., notary public, of Pittsburgh, Penna.

BY THE COURT.

Filed April 19, 1887.
H. D. GAMBLE, *Clerk.*

19 *Appointment of S. A. Burnham Examiner.*

In the Circuit Court of the United States for the Western District of Pennsylvania, November Term, 1886.

ARTHUR KIRK
vs.
JOHN E. DU BOIS. } No. 39. In Equity.

And now, to wit, April 27th, 1887, on motion of complainant's solicitors, the court appoints S. A. Burnham, U. S. commissioner, residing at Chicago, Illinois, examiner to take testimony on part of complainant in the above-entitled suit in accordance with the 67th amended rule in equity.

BY THE COURT.

Filed April 27, 1887.
H. D. GAMBLE, *Clerk.*

20 *Order Appointing Examiner.*

In the Circuit Court of the United States for the Western District of Pennsylvania, November Term, 1886.

ARTHUR KIRK
vs.
JOHN E. DU BOIS. } No. 39. In Equity.

And now, to wit, May 13th, 1887, on motion of W. Bakewell, of counsel for complainant, Charles J. Ferlong, notary public, of Buffalo, N. Y., is appointed special examiner to take testimony on behalf of the complainant in the above-entitled cause.

BY THE COURT.

Filed May 13, 1887.
H. D. GAMBLE, *Clerk.*

21 *Order Appointing Special Examiners on Part of Def't.*

In the Circuit Court of the United States for the Western District of Pennsylvania, November Term, 1886.

ARTHUR KIRK
vs.
JOHN E. DU BOIS. } No. 39. "In Equity."

And now, June 18th, 1887, on motion of T. H. B. Patterson, attorney of defendant in above case, the court appoint Truman Ames, Esq., notary public at Du Bois, Clearfield Co., Penna., and W. B. Corwin, Esq., notary public at the city of Pittsburgh, Penna., special examiners to take testimony and evidence on behalf of said defendant to be used in hearing and argument of said case.

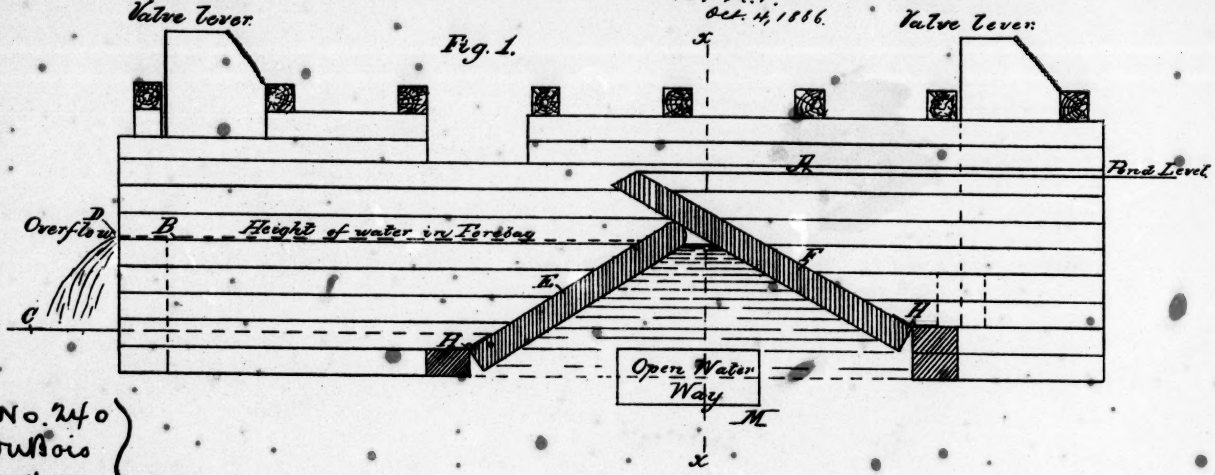
BY THE COURT.

Filed June 18, 1887.
H. D. GAMBLE, *Clerk.*

"Exhibit Kirk Sketch A".

N.R.C. N.P.
Oct. 4, 1886.

Fig. 1.



No. 240
DuBois
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Kirk
&
No. 259.
Kirk
v.
DuBois

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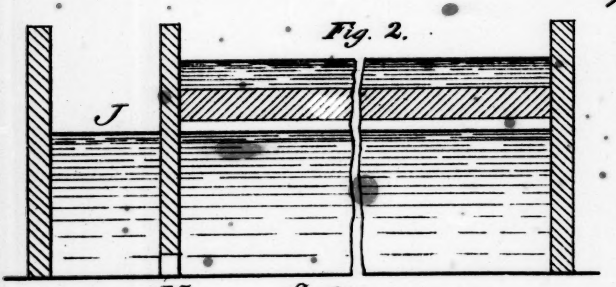
Exhibit Kirk. Sketch A.

N.P.C.
N.P.
Oct 4, 1886

Fig. 2.



Section x–x.

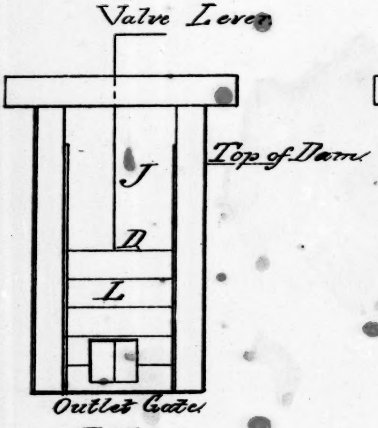


Fig. 3.
elevation of lower end wall of forebay.

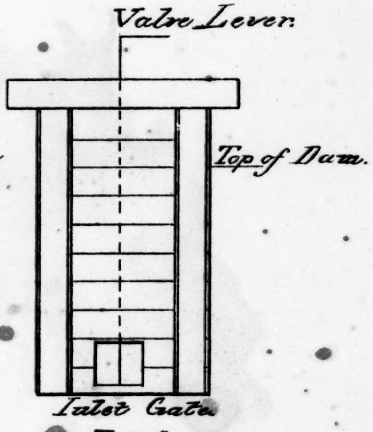


Fig. 4.
elevation of upper end wall of forebay.

No. 240
DuBois
vs.
Kirk
No. 259
Kirk
vs.
DuBois
} p. 30

22 *Testimony.*

ANTHONY H. TRIMBLE, a witness produced on part of complainant, being duly sworn, deposes and says, as follows:

Int. 1. State your name, age, residence and occupation.

Ans. Anthony H. Trimble, age 28 years; residence Allegheny City, Pa.; occupation, I am an insurance agent. I also keep books for my father, who is a contractor.

Int. 2. State whether you have ever been at Du Bois, Pennsylvania, and if so, when was your last visit?

23 Ans. I have been. I arrived there about 9 p. m., September 27, 1886.

Int. 3. When there, did you see any dams on the property of John E. Du Bois, defendant in this case?

Ans. Yes, sir.

Int. 4. Describe the construction of any of these dams, referring to a sketch, if you will, and point out on the map which I now show you, which purports to be a map showing the general location of some of the Du Bois dams, what dam it is you will describe.

Ans. On this sketch, I would say it is dam No. 8. I have sketches in my hand which represent the construction of said dam No. 8.

(Counsel for complainant offers the sketches (two sheets) referred to by witness, and the same are marked "Exhibit Kirk Sketch A, Sheet 1 and Sheet 2.")

(Here follow diagrams marked pp. 29 & 30.)

(Counsel for defendant objects to the said exhibit as incompetent and irrelevant.)

Int. 5. Refer now to "Exhibit Kirk Sketch A," and with reference to it, explain the construction of dam No. 8.

Ans. The leaf marked F here I take for the upper leaf of the dam, which the water from the upper part of the dam comes over. The one marked E is the lower leaf. The letter A here represents the height of the water when the dam is up.

Int. 6. How were these leaves E and F fastened to the foundation of the dam?

Ans. By hinges H.

Int. 7. What does the part marked J in figure 2, represent?

Ans. The height of the water.

Int. 8. What is the fore bay of the dam which you refer to? Describe it.

Ans. I would say it is a box constructed at the side of the dam.

Int. 9. How were the sides of the box constituted?

24 Ans. Boarded up with plank.

Int. 10. How about the ends of the fore bay?

Ans. They were boarded up with plank.

Int. 11. What do the three vertical walls in figure 2 of the sketch represent?

Ans. No. 1 represents the far side of the dam; No. 2 is between fore bay and dam; No. 3 outside of fore bay.

Int. 12. What walls constitute the side walls of the fore bay?

Ans. Nos. 2 and 3.

Int. 13. What was the height of the upper end wall of the fore bay?

Ans. It was five feet higher than the lower end.

Int. 14. What was the height of the lower end wall of the fore bay as compared with the elevation of the comb of the dam when raised?

Ans. The lower end of the fore bay was eight inches lower than the comb of the dam when up.

Int. 15. Did you see this dam work?

Ans. Yes, sir; several times.

Int. 16. To raise the dam, what was done?

Ans. The lower lever was let down and seemed to close a hole down there, that is, in the lower end of the fore bay. Then the water would rush right under the leaves of the dam.

Int. 17. Where did the water come from?

Ans. It came in at the upper end of the fore bay. It came from a pool above the dam.

Int. 18. Where did it go after it got into the fore bay?

Ans. Under the leaves of the dam.

Int. 19. What was the effect of that?

Ans. It caused the leaves to rise.

Int. 20. How was the dam lowered?

Ans. By closing the upper end of the fore bay and opening the lower end.

25 Int. 21. What was the effect of that?

Ans. The leaves went down, and the water went into the pool below.

Int. 22. State as nearly as you can what was the width of the leaves of the dam?

Ans. From 10 to 12 feet.

Int. 23. What was the elevation of the comb of the dam when raised?

Ans. About three feet.

Int. 24. Did you see this dam at the time of the visit to Du Bois which you refer to?

Ans. Yes, sir.

Int. 25. When did you see it?

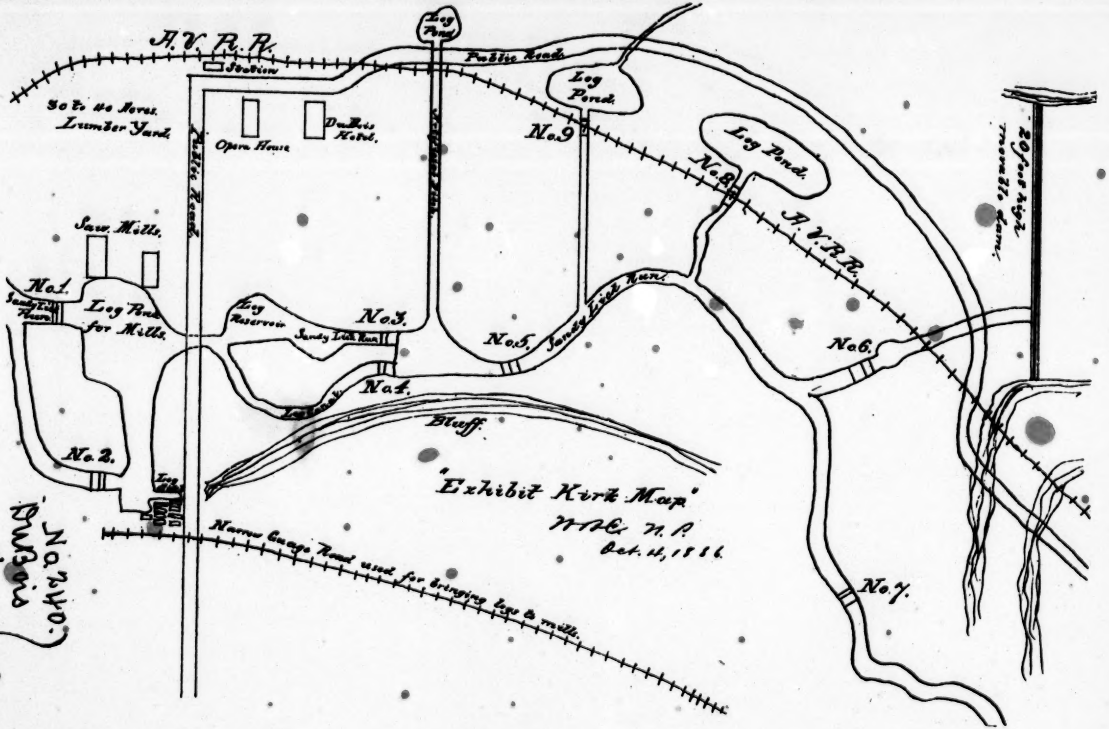
Ans. On the 28th of September, 1886.

Witness identifies the sketch which he refers to in Int. 4, as being sketch marked "Exhibit Kirk Map."

Cross-examination by Mr. PATTERSON:

X Int. 26. Did any one accompany you on your visit to Du Bois on the occasion you have testified to, and if so whom?

Ans. Mr. John Paisley.



No. 240. DuBois & Kirk
No. 259. Kirk & DuBois
p. 28

X Int. 27. At whose request did you go to Du Bois on this occasion?

Ans. Mr. Paisley's request.

X Int. 28. How did you come to examine the dam about which you testify?

Ans. I was out that week for sight-seeing, and met Mr. Kirk there, and at his invitation went with him.

X Int. 29. Then it was at the request of Arthur Kirk, the complainant in this case, that you examined the dam?

Ans. Yes, sir.

X Int. 30. Did you ever examine any dams before?

Ans. No, sir.

26 X Int. 31. Did you ever build any dams or have any experience in regard to dams or their construction?

Ans. No, sir.

X Int. 32. Have you ever had any experience as a builder?

Ans. Yes.

X Int. 33. What have you ever built?

Ans. I couldn't say that I have ever built anything. My father has been in the business, and I have been with him. I know a good bit about the construction of buildings, I think.

X Int. 34. Were you ever with your father in the construction of any dams?

Ans. No, sir.

X Int. 35. Did you ever know your father to construct any dams within your own personal knowledge?

Ans. No, sir.

X Int. 36. Are you a relation, friend, or acquaintance of Arthur Kirk, the complainant, and if so, to what extent?

Ans. The first time I met him was at Du Bois.

X Int. 37. Did you receive any compensation from him in any shape or form, or any promise of compensation, for your services in this matter?

(Objected to as irrelevant.)

Ans. No, sir.

A. H. TRIMBLE.

(Counsel for complainant offers in evidence the sketch referred to by A. H. Trimble in his answer to the 4th Int., the same being marked "Exhibit Kirk Map," W. B. C., N. P.; and it is admitted by counsel for respondent that said map purports to be a representation in a general way of the Du Bois dams, at Du Bois, Clearfield county, Pennsylvania, and while not admitting the sketch to be correct, yet counsel for respondent is willing that it shall be used in connection with the testimony.)

(Here follows diagram marked p. 28.)

27 Counsel for complainant states that this sketch is not intended to be geographically correct, but is offered in evidence simply for the purpose of showing in a general way the relative

positions of the different dams, and for identifying the same, and for preventing confusion in the testimony.

Counsel for complainant offers in evidence the original copy of the U. S. patent, No. 268,411, granted to Arthur Kirk, the complainant, on the 5th day of December, 1882, for an improvement in movable dams, the same being the letters patent in suit, said patent having already been filed in this case on motion for preliminary injunction. It is entitled "complainant's patent."

Counsel for complainant further states that the defendant is charged with infringement of the sixth claim of said patent.

(Objected to as incompetent and irrelevant, and because the improvement thereby claimed to be covered is not new and useful, and of a frivolous character, and because said letters patent are null and void, having been obtained by fraud and misrepresentation and false swearing.)

(Counsel for complainant objects to the time and manner of the objection, and to the whole objection as being unwarranted and frivolous.)

Adjourned to Thursday, December 23d, at 9.30 a. m.

PITTSBURGH, *Dec.* 23, 1886.

Met pursuant to adjournment.

Present: Counsel as before.

THOMAS P. ROBERTS, witness produced on part of complainant, being duly sworn, deposes and says:

Int. 1. State your name, residence and occupation.

Ans. Thomas P. Roberts; age, 43 years; residence, Pittsburgh, Pa., occupation, chief engineer of the Monongahela Navigation Company.

31 Int. 2. State what experience you have had in river navigation, so far as it relates to the construction and operation of dams and locks?

Ans. My first experience on river improvements was in the Government service on the Ohio river improvements between the years 1866 and 1870. I was principal assistant in charge of all the work, constructing wing dams, dredging operations, &c. In 1878 and 1879 I was in the Government service again. Designed a large lock for Ice harbor, mouth of the Muskingum river, in Ohio, and had charge of the first improvement of the Allegheny river, building several low crib dams, &c. I also in 1875, on the Monongahela river, located the position of dams No. 10, 11, 12, 13 and 14, in West Virginia, for the United States Government; and in 1872 I designed improvements for the upper Missouri river, while I was in the service of the Northern Pacific Railroad Co. My report was adopted by the Government and made a basis for an appropriation for that river. Since the fall of 1884, I have been engineer of the Monongahela Navigation Company, and have recently completed a new lock at dam No. 4, costing nearly $200,000, and have charge of all the various works of improvement connected with that company.

Int. 3. You have made hydraulic engineering your life study have you not?

Ans. It has occupied about half of my personal experience.

Int. 4. State whether or not you are familiar with the construction and operation of bear-trap dams?

Ans. Yes, sir; I can say that I am, that is I understand the principle of them. I have never built any or operated any myself. I have heard of them since the time I was a boy?

Int. 5. Have you ever seen a bear-trap dam, and if so, where?

Ans. I have seen the bear-trap dam placed in the Monongahela river at lock No. 1.

32 Int. 6. Was that dam there when you were connected with the Monongahela Navigation Company?

Ans. It was built before my connection with the company, but I have visited it, and it is still remaining in the river, but is not in use, having been very imperfectly constructed.

The foregoing question is asked for the purpose of showing witness' familiarity with bear-trap dams.

Int. 7. State whether or not you have read and are familiar with patent to Arthur Kirk, No. 268,411, so far as relates to the devices shown in figures 2 and 4, and claimed in the 6th claim of said patent.

Ans. I have read the patent carefully in connection with figures 2 and 4, and the 6th claim of the patent.

Int. 8. What do you understand to be Mr. Kirk's invention, as stated by this patent with reference to the device shown in figures 2 and 4, and claimed in claim 6.

(Objected to as incompetent and irrelevant, for reasons hereinbefore stated in former objections, and also for the reason that the language in said claim and the meaning of said figures 2 and 4 are perfectly patent, and manifest their own intentions.)

Ans. Claim 6 appears to be a description of a relieving sluice, and the advantage of its use consists in the fact that it fixes the limit of pressure that the dam can receive.

Int. 9. What difficulty, if any, does this relieving sluice obviate?

Ans. Before the introduction of this relieving sluice, when bear-trap dams became full, an enormous pressure was exerted on the upper and lower leaves, and extending to the hinge on the upper leaf, sometimes so great as to cause the lower leaf to fall over downstream. To prevent this, various devices have been experimented with, such as chains to hold the leaves on the floor. These chains, or other means of support, developed too much pressure at certain points; concentrated the pressure at certain points, and con-

33 sequently the gates were liable to buckle or bulge, with a tendency to rupture the hinge. The relieving sluice claimed by Mr. Kirk in the sixth claim of his patent, is an automatic device arranged so that the water remains a little below the level of the upper pool, and no surplus pressure can be brought to bear

within the gate while the sluice permits the outlet of water at its level.

Int. 10. State whether or not you have read the deposition of A. H. Trimble, given on the part of the complainant in this case.

Ans. I have.

Int. 11. State whether or not you find in the bear-trap dam described in said deposition and shown in the drawings filed as exhibits therewith, a bear-trap dam with a relieving sluice extending from under the gates?

(Objected to as incompetent and irrelevant, and for all the other reasons set forth in the former objections, to testimony and evidence offered in this case.)

Ans. The exhibits accompanying the deposition of Mr. Trimble appears to make it very clear that the dam that he speaks of is provided with a regulating sluice, such as described in claim 6 of Mr. Kirk's patent. The fact that there is a difference in the level between the water in the gate and the pool above indicates this without anything further.

Int. 12. What is the cause of this difference in level?

(Objection continued.)

Ans. Simply because there was an outlet furnished of greater discharging capacity than the inflow at that elevation of the dam would amount to, and water will never rise higher than the elevation of a free-discharging point.

Int. 13. Referring to the drawings filed with Mr. Trimble's deposition, state in what respect the relieving sluice extends from under the gates?

(Objection continued.)

34 Ans. All the water under the gate is in direct connection with this relieving sluice, and it can rise no higher under the gates, as I said before, than the level of this overflow point. It is just as if a pipe were introduced into the chamber. It seems to be all very clearly illustrated in the drawings; thus in figure No. 1, the water under the gates E and F, which form the upper and lower leaves (end view) of the bear-trap gates, the water within such gate is indicated by the dotted line, B, that is the level of the water, discharging into the lower pool from a height eight inches lower than the pond level above the dam, marked A.

Int. 14. State how the water from beneath the gates gets into the pool below.

(Same objection continued.)

Ans. Plan No. 1 indicates a section of the sluice in the bear trap through which the water can flow from the fore bay into or out of the bear-trap gate; thence it may fall over a bridge or wall several inches or more lower than the comb of the dam.

Int. 15. What would be the effect if the end wall of the fore bay were as high as the comb of the dam?

(Same objections continued.)

Ans. The gate would then receive the full hydrostatic pressure every time it was filled, and this pressure would stand permanently on the dam as long as it was up, causing the unequal strains I described in a previous answer.

Int. 16. Look at the figure 4 of the drawing of the Kirk patent and state what differences, if any, and what similarities exist between the dam there shown and that shown in the drawings and described in the deposition of Mr. Trimble?

(Same objection continued.)

Ans. The principles illustrated in the two sets of drawings are precisely the same, or identical. Figure 4, for instance, of the Kirk patent, represents at 41 the outlet or bridge wall somewhat lower than the pool of the water above; so also figure No. 2 "Exhibit Kirk Sketch A" shows a difference in level maintained by the regulating sluice.

Int. 17. What part of "Exhibit Kirk Sketch A" corresponds to the part marked 40 in figure 4 of the patent?

(Same objections continued.)

Ans. The fore bay J in figure 2 of "Exhibit Sketch A." The drawings are simply reversed, in one the fore bay is on the right and in the other it is on the left.

Int. 18. What in "Exhibit Kirk Sketch A" corresponds to the part 39 of the patent?

(Same objections continued.)

Ans. It is shown in No. 1 marked M or "open water-way," which is the regulating sluice.

Int. 19. In his patent, Kirk says on lines 122 to 126 of page 2, "A modified construction of the sluice 38 is shown by figure 4, where the outlet 39 in the wall is below the level of the water, the latter passing through the outlet 39 into a fore bay or well 40 and thence over the bridge 41" does this language, in indicating that the water flows from under the gates into the fore bay, correctly describe the course of the water in a bear-trap dam?

(Same objections continued.)

Ans. Yes, sir; it seems to be very clear.

Int. 20. What is the direction of the current of water between the gate chamber and the fore bay when the leaves of the dam are up? State the reasons for your answer.

(Same objections continued.)

Ans. The water might be standing if everything was perfectly water tight, but if by any means, water would continue to enter the gate or dam chamber it would flow out into the fore bay and thence over the bridge wall. The difference in level between the water in the gate chamber and the pool above would naturally cause a continuous current to enter through the inlets provided, and the direction of the current would be outward through the sluice into the

fore bay, and over the bridge wall as before described, thus
36 making a continual relief, or automatic arrangement of relief for relieving undue pressure.

Int. 21. What do you mean by the inlets provided?

(Same objections continued.)

Ans. I am supposing a case of more than one inlet, the inlets may be these relieving sluices. There may be an inlet provided at one end and an outlet at the other end of the gate, or both of them, in the case of two, may be receiving and discharging inlets.

Int. 22. Suppose the case of bear-trap dam having only one opening communicating with a fore bay and gate chamber, and suppose the leaves to be raised to their full height, now tell me the direction of the current?

(Same objection continued.)

Ans. In practice it is found from what little I have seen of full-sized gates, that the current would be nearly always inward, carrying water to make up for the loss from leakage, etc.

Int. 23. What do you mean by inwards?

(Same objections continued.)

Ans. The water must flow inward to fill this gate chamber.

Int. 24. I am speaking now of a case where the leaves are raised to their full height; with this explanation, the last question is repeated.

(Same objections continued. I further object that this is a repetition of Int. 22, as to the point of the leaves of the gates being raised to their full height, and I object to pressing the witness on a second question as to a point he has already answered.)

Ans. It might be well to explain that it is difficult, if not impossible, to prevent leakage from the pool above, between crevices under the gates along its edges into the gate chamber, and in such case the flow would be outwards through the relieving sluice into the fore bay, and so over the wall, the outlet.

37 Int. 25. What would be the effect of making the gates fit so neatly between the walls of the dam as to prevent this leakage? I mean the effect on the gates, and not on the water.

(Same objections continued.)

Ans. They would probably be subjected to a greater upward pressure, and would require therefore greater strength in their various parts.

Int. 26. What is the purpose of putting them loosely between the walls?

(Same objections continued, and the question is also objected to as leading, and as asserting a purpose which the witness' testimony has shown to be a mere accident or defective construction.)

Ans. There are two important reasons why in actual practice, the gates should be arranged with this extra space about them; one is

that there may be a margin for unequal settlement of the structure; the other is that the infiltration of sand may have some mode of being washed out, about and underneath the gates. Imperfect construction, which I allude to in the first part of my testimony, had reference to the choice of material and mode of putting them together, and had no reference to these spaces left about the gates.

Adjourned to December 27th, 1886, at 10 o'clock a. m.

PITTSBURGH, PA., *December* 27, 1886.

Met pursuant to adjournment.
Present: Counsel as before.

Examination of Mr. ROBERTS resumed:

Witness says: I desire to correct my answer to Int. 22.

(Mr. Patterson objects for the same reasons hereinbefore stated, and also objects to the witness now supplementing his testimony-in-chief, which is closed, unless after cross-examination, and then upon matters rendered necessary by such cross-examination; and
38 if witness insists upon making his explanation at this time, it is insisted that he must state what, or who suggested the making of such further explanation.)

Witness says: I did not fully understand the meaning of the question, since I did not consider the limitation that the leaves of the gates were supposed to be raised to their full height. The facts are fully stated in my answer to Int. 24.

Cross-examination by Mr. PATTERSON:

X Int. 27. Who, or what suggested to you since the close of your examination-in-chief, the necessity of making the explanation with regard to your answer to Int. 22, that you have just made?

Ans. It was suggested to me by the apparent confusion of my answers to several of Mr. Bakewell's questions towards the end of the testimony-in-chief, and I merely wish to make myself understood.

X Int. 28. Did any one speak to you about this confusion, or call your attention to it in any way after our last adjournment?

(Objected to as irrelevant and immaterial.)

Ans. I spoke of the matter immediately after adjournment to Mr. Bakewell, and suggested my desire to make the correction, and pointed to my answer in Int. 24 as more correctly defining my ideas.

X Int. 29. Did you speak to Mr. Bakewell about it before he made any remark to you in regard to your testimony?

Ans. I spoke first; it was on my mind to do that.

X Int. 30. Then you received no suggestion about it from anybody else?

Ans. Mr. Bakewell seemed to think it would be desirable to make this explanation.

X Int. 31. Have you ever seen any bear-trap dams constructed under the Du Bois patents or by Mr. John Du Bois, or by
39 Mr. John E. Du Bois, in practical or for practical use, excepting the dam at dam No. 1 chute in the Monongahela river built by John Du Bois, now deceased, in his lifetime, and transferred by him before his death to the Monongahela Navigation Co.?

(Objected to, because it does not appear that Mr. Du Bois has or ever had any patents, nor that the witness has ever seen any supposed patents of Du Boise, or knows of their existence or scope.)

Ans. The dam referred to is the only full-size or large scale bear-trap dam, or gate, which I can recollect having ever seen.

X Int. 32. Do you know by whom it was built?

Ans. It was built by John Du Bois, now deceased. I was personally acquainted with Mr. Du Bois.

X Int. 33. In the fall of 1884, when you became the engineer of the navigation company, I mean the Monongahela Navigation Company, was the dam that you refer to, then the property of the Monongahela Navigation Company?

(Objected to as irrelevant and immaterial.)

Ans. The arrangement between Du Bois and the navigation company has never been fully carried out by Mr. Du Bois; and I think that the navigation company does not claim possession of the gate.

X Int. 34. Did they not have it and operate it for some time as a part of dam No. 1, before Mr. John Du Bois' death?

(Objection continued.)

Ans. The gate was never in operation successfully. The company was compelled to place a temporary dam above the Du Bois gate in order to hold the water in dam No. 1 at the ordinary pool level, as the Du Bois gate refused to operate.

X Int. 35. Do I understand you to state that the Du Bois gate in dam No. 1 was never used or operated by the Monongahela Navigation Company through its employees?

40 (Objection continued.)

Ans. The employees never took charge of it. I can't answer this question from personal knowledge.

X Int. 36. Did John E. Du Bois individually ever construct or do anything in connection with that Du Bois gate in dam No. 1?

(Objection continued.)

Ans. I can't at the present time recall anything that he has ever done.

X Int. 37. Was there any trouble in connection with that Du Bois gate at dam No. 1 arising from the foundation?

(Objection continued.)

Ans. There was.

X Int. 38. Were the foundations of that Du Bois gate defective and unreliable?

(Objection continued.)

Ans. Yes, sir.

X Int. 39. Have you ever personally inspected or examined any other adjustable dam which was alleged, or claimed to have been constructed on the Du Bois plan, either by Mr. John Du Bois, deceased, or by Mr. John E. Du Bois, or the employees of either of them, except the Du Bois gate in dam No. 1 above referred to; I mean for practical use, in practical use?

Ans. I have not.

X Int. 40. In practical hydraulic dams, have you ever had any personal experience with any of the modern improved adjustable dams?

Ans. I have not had any practical experience. I have visited them and examined them.

X Int. 41. Specify what ones, and on what plans of construction were those which you visited, and when and where did you make such visits?

Ans. Frequently to the Davis Island dam, which is of
41 the Chanoine construction. I have the plans of others, a number of others which I have studied, in my office.

X Int. 42. State of what others you have plans?

Ans. I can't recall the names; they are mostly foreign, French, German and Italian.

X Int. 43. Do any of these dams use the principle of the improved bear-trap dam in their construction?

Ans. Some of the early French dams do. So also does the American plan of George W. Parsons, and to some extent you might say Mr. Felix R. Brunot.

X Int. 44. Do any of these plans that you have mentioned use the device claimed by Arthur Kirk in this case?

Ans. Not one of them to my knowledge. I first heard of the suggestion from Mr. Kirk before he had it patented. I mean his plan.

X Int. 45. With regard to the actual construction of the dam alleged to be owned and used by the defendant, John E. Du Bois, near the town of Du Bois, in Clearfield county, have you any knowledge, except such as you have derived from the testimony of Anthony H. Trimble, and from the "Kirk sketches, Nos. 1 and 2," in evidence in this case?

Ans. I have not.

X Int. 46. Look at "Kirk sketche, sheet 2," and the sketch marked Fig. 2, and state which of the walls marked 1, 2 and 3, is the end wall of the dam, or gate?

Ans. No. 2 is one end and No. 1 is the other.

X Int. 47. If the water were passed under the gates and then allowed to escape, in the form of dam illustrated in these two sheets, (Nos. 1 and 2,) through the end wall of the dam by means of an open sluice, water-way or tail race, while the water was still flowing under the dam, or gate, which would then be the end wall of the

dam or gates, in which you would understand said outlet, or tail race, to be located; said outlet, or sluice, leading from under the dam into the pool below the gates?

42 Ans. It would be located between the walls marked Nos. 2 and 3.

X Int. 48. Would it be so located when the space between the walls 2 and 3 constitutes the fore bay or inlet flume, through which the water is, at the time specified, actually flowing under the gates of the dam, and when said fore bay or inlet flume extends the whole length of the figure in sheet No. 1, from the upper end wall of the fore bay, Fig. 4, in sheet 2, to the lower end wall of the fore bay, Fig. 3, in sheet 2; if the end walls of the fore bay are of the same height?

Ans. I don't think that it makes any difference as regards the length or dimensions of the inlet connecting the fore bay with the gate chamber. If the lower partition of the fore bay is as high as the upper one, the water in that case would not flow out over the lower bridge or partition and the dam or gate would be subject to the full hydrostatic force due to its lift. The end walls remain the same. I cannot see how the opening or shutting of a valve can shift the position of the walls. I don't understand the question any further than I have stated.

X Int. 49. The conditions remaining the same as stated in the last three questions, which would be the end wall of the dam described in the following language: "In the end wall of the dam, I make an open sluice, water-way, or tail race 38, figure 2, at such height as will permit all water which is not required to sustain the gates to escape from under them. When the gates are down, as in the position shown in figure 1, the water is admitted by the wickets under them. This raises them and floats them until they reach the position shown by figure 2. By that time, the water having reached sluice 38, which passes through the wall around the end of the gate, will flow freely through, sustaining the gates at that level."

(Copy of Kirk patent and drawings shown witness in connection with this question.)

43 Ans. It would be the wall marked No. 2, though it is not indicated in said wall; in "Kirk sketch A," figure 2. This outlet that you speak of can be located in either wall. For greater convenience for getting at it, it could be on the land side, in which case the outlet would have to be arranged and kept separate from the water in the fore bay. I am keeping in mind all the time the application of these bear-trap gates to river improvements.

X Int. 51. Under the conditions set forth in the last question, would it be understood by a practical hydraulic engineer that outlet 38 was intended to be constructed between the gate chamber through the partition wall between that chamber and the fore bay, and would such construction be practicable?

Ans. It would be as simple as *a*, *b*, *c*, merely having a pipe to pass the water discharging from the gates through the fore bay into the

pool below. This would be the best way, because no crossing of the stream would be required to clean it out or make necessary repairs. It could, of course, be arranged on the other side if desired.

X Int. 52. In either wall the construction of outlet 38 would have to be equivalent, and would have to be constituted by a pipe, or independent flume opening from the gate chamber and continuing until it opened into the pool below the lower gate?

Ans. That would be so only so long as you have the lower end of your fore bay at the height of the upper pool. It would not be necessary to make a separate and independent outlet if the partition at the lower end of the fore bay, called the bridge, was made lower.

X Int. 53. Under the conditions of the former question which is the question I asked you, and not for any voluntary suggestions, and in all cases in which the exact construction of outlet 38 as shown in the drawing referred to as attached to the Kirk patent, would not the construction be practically the same in either end wall of the gate chamber?

44 Ans. In reference to the first part of the question, the arrangement would be as described; but in reference to all cases where the flume marked 38 is introduced into the plan, it could be differently arranged, as I have endeavored to explain.

X Int. 54. Under the conditions stated in last question, can outlet 38 be differently constructed and still adhere to the exact mode of construction described in the language and drawing hereinbefore referred to?

Ans. I see nothing in the language quoted from the Kirk patent to interfere with the different arrangement of which I have spoken.

X Int. 55. If the inventor should state to you that his invention consisted in making an opening in the lock wall, or in the shore wall of the dam, this opening to be connected by a channel or pipe of sufficient capacity, with the lower pool of this dam, what exact mode of construction and in which wall of the dam would you understand him to intend to construct his outlet?

(Objected to as being improper cross-examination. It does not appear that there is any basis for the hypothetical question propounded to the witness.)

Ans. I would ask him if he was referring to dams constructed for the mere shooting of logs, or for river improvement, first. If I knew what kind of dam he was speaking of, I would be better able to understand his proposition. In a small dam, such as used in shooting logs, of a few feet in length, I would presume that he would arrange the outlet at the opposite end of the supply. Thus it might be at No. 1 in "Kirk sketch A, figure 2," but as before said, nothing definite could be known in regard to it from the statement made me.

Adjourned to January 7, 1887, at 9.30 a. m.

45 PITTSBURGH, PA., *January* 7, 1887.

Met pursuant to adjournment.
Present: Counsel as before.

X Int. 56. Is there any other dam, the actual existence of which is proved in this case, excepting the one testified to by Anthony H. Trimble, which is any way connected with, or claimed to be the property of the defendant, John E. Du Bois?

Ans. I cannot answer the question, because I have no knowledge of what testimony may have been produced before in this case.

X Int. 57. Is there any other dam which is claimed to belong to the defendant, John E. Du Bois, or to be in any way connected with the said defendant, of which you have any knowledge of its actual existence, description, or dimensions, except that testified to by Anthony H. Trimble, upon whose testimony you based your former testimony?

Ans. There is none.

X Int. 58. If that be so, then why in your answer to X Int. 49, and the other interrogatories therewith associated, do you state, "I am keeping in mind all the time the application of those bear-trap gates to river improvements"?

Ans. The questions referred to, in which I gave that answer, I took to require illustrations of the principles. There was nothing to disturb the principle in the answer that I gave.

X Int. 59. Look at X Ints. 45, 46, 47 and 48, and state whether or not those interrogatories are not in regard to the dam testified to and identified by sketches in the testimony of Anthony H. Trimble, and explain why therefore you make an answer with regard to any other dam than that testified to, and on which you were interrogated?

Ans. I do not understand that the sketches and plans gave
46 the length of the gate. I supposed that the length of the gate was immaterial. That being the case, in my mind I had a picture of the dam applied to river improvements. I believe there are no dimensions or length given on the plans of the Trimble sketches, and further I was thinking of the disadvantages of a bridge across the dam.

X Int. 60. State whether or not, in any of the cross-interrogatories, you were asked for testimony on what you imagined, or thought, separate and apart from the actual dam testified to by Anthony H. Trimble in this case, and if so, specify where you were asked for your imagination or thoughts?

Ans. I supposed that I was asked as an expert to answer questions in regard to principles, and my imagination had to take the best way it could to answer the question.

X Int. 61. Look at Int. 10, 11, 12, 13, and X Int. 45, and state whether you have any explanation or qualification of your testimony in answer to those interrogatories to make?

Ans. There is nothing except that there are other questions along in my testimony connected with other plans, and my mind natu-

rally took a broad view of the whole subject. The answer to those particular questions I don't think require any further explanation.

X Int. 62. Look at the answer of Anthony H. Trimble to Int. 22 and your answer to X Int. 55, and state whether or not the conclusion of your answer to X Int. 55 is not the only proper testimony with regard to the dam in question in this case, in view of the answer of Anthony H. Trimble to Int. 22?

Ans. I don't think that I am a competent judge of the value and importance of my own testimony.

X Int. 63. Look at the answer of Anthony H. Trimble to Int. 22, and state whether or not there is any other dam in existence as the property of, or connected with the defendant and in question
47 in this case, other than a small dam such as is used in shooting logs of a few feet in length, such as is referred to by you in your answer to X Int. 55?

Ans. In my testimony before, there seemed to be no importance attaching to the length of the dam, and my attention was never called pointedly to that feature, and I cannot understand why so much importance should be attached to that point now. I know of no other dam in existence than the one referred to in this case.

X Int. 64. Then the conclusion of your answer to X Int. 55 is your testimony in regard to the only dam in question in this case, is it, or is it not?

Ans. No, sir; I do not say that. In Int. 55 a hypothetical question is put to me, in which the dam may be any length and applied to any purpose, and I have endeavored to answer it as well as I was able to answer it at that time. No reference is made whatever to the Anthony H. Trimble dam in answer to X Int. 55.

X Int. 65. If X Int. 55 were qualified so as to apply only to such dam as testified to by Anthony H. Trimble, then would the concluding portion of your answer to said cross-question be your testimony as applicable to such dam?

Ans. Not altogether, in case he would state it was a logging dam. I think part of my answer here would just follow on right after what I have said in answer to X Int. 55, as follows: In a small dam, such as used in shooting logs of a few feet in length, I would presume that he would arrange the outlet at the opposite end of the supply. Thus it might be at No. 1 in "Kirk sketch, figure 2," but as before said, nothing definite could be known in regard to it from the statement made me.

X Int. 66. "When the gates are down, as shown in figures 1 and 2, (attached to Kirk patent), the water is admitted by the wickets under them. This raises and floats them until they reach the position shown in figure 2. By that time the water having
48 reached the sluice 38, which passes through the wall around the end of the gate, will flow freely through, sustaining the gates at that level." State whether or not there is anything in the language quoted which indicates that the inlet wickets are closed or used as outlet 38, and also whether or not the language indicates on the contrary that the inlet wickets remain open at the time the water

under the gates reaches the sluice 38, and that the water is to flow or pass freely through?

Ans. The language of the patent indicates that the wickets are open and that it flows out at 38, when the gate has reached the height indicated in figure 2 of the patent.

X Int. 67. Then does the language quoted in connection with the figures referred to, indicate that sluice 38 is a separate opening from the wickets constituting the inlet?

Ans. As I have before said, separate independent outlets may be provided or may not be provided. Figure 38 does not represent the shape of the outlet. Figure 38 represents the elevation of the discharging point. When the water reaches that level it flows out. Which way, and in what manner it may flow out is a matter of detail. 38 are not the wickets constituting the inlets in this case.

X Int. 68. Then is outlet, or sluice 38, referred to in the last interrogatory, a sluice separate from the inlet wickets referred to in said interrogatory?

Ans. I have answered that question in various ways, and so many hypothetical questions have been mixed with it that I do not understand that I can make myself more clear in regard to it. In figure 2, I would understand it to be separate from the inlet. It is not necessarily so.

(Counsel for the defendant objects to the statement contained in the last sentence of the witness' answer as not responsive to the question asked.)

X Int. 69. "A modified construction of sluice 38 is shown by figure 4, where the outlet 39 in the wall is below the level of the water, the latter passing through outlet 39." State if there is any-
49 thing in the above words quoted from Kirk's patent which indicates that the modified construction of sluice 38 does not still remain separate from the inlet wickets?

(Objected to because the counsel for respondent has ended his quotation in the middle of a sentence of the patent, and therefore the question is apt to confuse, and is not competent.)

Ans. I can't understand the question unless I take into consideration the rest of the paragraph from the patent. I can't answer it.

X Int. 70. In answer to Int. 24 you explain that it is difficult to prevent a leakage from the pool between the crevices under the gate along its edges; and then in Int. 25 you explain the difficulty with regard to making the gates fit so neatly against the wall of the dam as to prevent leakage; state whether or not the same looseness of construction and leakage would apply to the down-stream leaf of the dam as to the upstream?

Ans. I could not tell whether there would be any material difference in leakage between the upper and lower leaves. Practically the space between the gates and the wall would be the same.

X Int. 71. In the case of an adjustable dam, such as is in question in this case, if there were any device used by which the up-

stream leaf of the gate was rendered water tight, or practically water tight when raised to its full height, then would there be any leakage from the upper pool into the chamber beneath the gates or dam as would under your former testimony create any outward current from under the leaves of the dam into the inlet flume, as long as the upper inlet into the said flume was open so as to receive the full pressure from the upper pool to the full capacity provided for that inlet flume?

(Objected to, first as immaterial, and second because it supposes an hypothesis for which there is no basis appearing in the testimony.)

50 Ans. This question supposes the upper leaf water tight. Therefore no water can pass through it. Still, water may enter in other ways. No water can pass through the upper leaf when it is supposed to be water tight. That is all I can understand from the question.

X Int. 72. Look at this model; in case of a dam constructed as shown in this model, with cleats on the two walls above the upper leaf, I mean the side walls of the chute or dam chamber, said cleats being so adjusted that when the leaves of the dam are raised to their full height, the upstream leaf will fit closely against said cleats, which are wide enough from said walls outward to entirely close the space left between the edges of said upstream leaf and the said walls to the full height to which the down-stream leaf rises under the upstream leaf, would there be any practicable leakage from the upper pool around said upstream leaf as long as the upstream inlet of the flume remained fully open?

(Counsel for defendant offers the said model in evidence, and the same is marked "Defendant's Exhibit Du Bois Model A," for the purpose of showing the exact construction of defendant's dam in question in this case, so far as the gates, cleats, inlets, and outlets involved in this question.)

Ans. There cannot be leakage around those cleats if they are water tight, but that does not provide for the leakage along the hinge edge.

Adjourned to January 10, 1887.

PITTSBURGH, PA., *January* 10, 1887.

Met pursuant to adjournment.

Present: Counsel as before.

X Int. 73. In practical construction, in an adjustable dam, with upstream and down-stream gates on the bear-trap principle,
51 would it be of any use to make the down-stream gate water tight, when the upstream gate had been made practically water tight by any device for that purpose?

(Objected to because this hypothesis does not fit any evidence in the case.)

Ans. I think that in practice it would be advisable to have all parts as tight as possible in order to prevent unnecessary waste of water.

X Int. 74. If it is important to relieve the leaves or gates of an adjustable dam (on the bear-trap principle) from the upward pressure under them, would it not be practicaliy better to leave the down-stream gate, or leaf, without any water-tight device between it and the walls or abutments? This question means when the gates are at their full height.

Ans. I think that in practice it would not be advisable to depend on such an arrangement to relieve the pressure of the water under the gates. I would say it would not be practically better, because that would be designing in the plan imperfect work. Leaks through wood, particularly in the case of muddy water, have a tendency to cut and enlarge themselves, particularly so when there is any pressure or velocity. I have seen that illustrated in many dams.

X Int. 75. If the edges of the dam leaves were properly protected with edges indestructible by water, would not the leaving of the down-stream leaf without any water-tight device be better, practically, as a precaution against leakage or escapeage?

(Objected to, being improper cross-examination, for the reason given in last objection.)

Ans. I think it would not, for the reasons given in the last answer.

X Int. 76. In a dam on the bear-trap principle so constructed that the upstream leaf is provided with a water-tight device preventing any leakage between said leaf and the walls or abutments, and wherein the down-stream leaf is left with the usual spaces between the edges of the leaf and the walls or abutments, and at the
52 hinges without any such water-tight device, would the leakage at the hinges of the upstream leaf practically amount to as great a leakage as that around and under the down-stream leaf; this when the upstream inlet into the flume is still left with the full pressure of the upper pool. This question is applicable to the dam testified to in this case.

(Objection continued.)

Ans. I think it would be almost impossible to arrange the upper leaf to be as tight as supposed in this hypothetical case, for the reason of unequal expansion of the gate chamber, so that it would not probably bear fully or equally at all points on the cleats that would have to be provided; therefore, in my opinion, it would not be advisable to rely on the leakage through the lower leaf maintaining the gates at the desired height.

X Int. 77. I didn't ask you for your opinion whether it would be safe to rely on this difference, I simply asked you whether or not, where there was a water-tight device at the sides of the upstream gate, and none at the sides of the down-stream gate or hinges, practically the leakage on the upstream gate would be less than the leakage on the down-stream gate?

Ans. In the working models which I have seen, it seemed to be impossible to overcome the difficulty of shutting off the greater leakage through the upper leaf; therefore, I do not think it can be practically so arranged. If no water can leak through the upper gate, of course then more water can leak out, if no precautions are taken on the lower leaf, than would enter above. I don't think there is any common sense in any kind of talk like that. The counsel supposes an impenetrable object in one case, and then asks me how much water could pass through it as compared with the water that would leak out through another space.

X Int. 78. (Quotation from the Kirk patent, lines 88 to 108.) "At the ends of the dam, I form a water-tight joint between the
53 gate or gates, and the stationary abutment 33, by means of a movable timber or piece, 34, running transversely of the gate in a recess on its edge. Back of the timber 34 is a recess or channel, 35, which communicates to the water above by a large inlet opening, 36, at the upper end, and has a smaller discharge opening, 37, at the lower end. The water from above, entering the channel 35 by the large opening 36, causes the pieces, 34, to be pressed out against the wall, 33, and form a tight joint therewith. The water escapes from the channel, 35, by the small exit, 37. There is little friction between the piece 34, and the wall 33, because as soon as the gate 2 begins to descend, the pressure on 34 is relieved and it falls back in the recess, 35. The discharge, 37, is to prevent the collection of sediment in the recess 35, which might prevent the working of the piece 34."

This language being taken in connection with figure 5 of the drawings attached to said Kirk patent No. 268,411, would you still maintain that if this device (figure 5), was used in the upstream leaf of a bear-trap dam, that there would still be more leakage around the said upstream leaf than there would be around the hinges of the down-stream leaf of such a dam, as is testified to in this case? This question is asked with the same conditions as to the height of the dam and the upper end of the inlet flume being open to the full pressure of the upper pool?

Ans. I am not prepared to express an opinion as to the merits of Mr. Kirk's contrivance to prevent leakage. I think nothing could be said as to the merits of that device until it is tried.

X Int. 79. I am not asking you about the merits of a device which, as you say, has never been tried, but I am asking you with regard to a certain effect of said device in case it accomplishes what the plaintiff in this case and the alleged patentee under the patent, with regard to which you testified in chief, claims it will do?

54 Ans. If it shuts off the water as stated, and no water enters through the upper leaf and along its edges, you would have the same old impenetrable object to compare with the lower leaf which is supposed to have leakage spaces. Then the leakage on the lower leaf would be greater than on the upper.

X Int. 80. Then under the term of said Kirk patent, and in view of the language and figures last quoted and referred to as taken therefrom, do you still believe that it was the intention of the plain-

tiff, Arthur Kirk, in providing for his outlet sluice water-way or tail race 38, to have meant said outlet or tail race as only a provision against the leakage that might enter around the gates or leaves of the dam?

Ans. That certainly seems to be the full object of that relieving sluice. The object of making the gates as tight as possible is to prevent waste of water. Mr. Kirk probably knows, as a practical man, that it is impossible to make absolutely water-tight joints, and would endeavor to shut off as much leakage as possible, and I presume that feature was introduced as a matter of economy in the use of the water, but would not appear to obviate the necessity of a relieving sluice.

X Int. 81. If as stated in questions just preceding the last, the device above claimed by Kirk, or some other similar device for shutting off leakage around the upstream leaf only were used, then would not the leakage around the down-stream leaf relieve the pressure from any such upstream leakage without any outlet sluice?

Ans. It might do so, but for reasons previously stated, I can't imagine how any reliable plan can be made to hold the water at a fixed level in the gates.

X Int. 82. Does it make any practical difference in the operation of such a dam as that testified to in this case by Anthony H. Trimble, whether the end wall of the flume or fore bay are of the same or different heights; I mean the upstream and down-stream walls.

55 Ans. It does make a difference, the down-stream wall is lower than the upstream wall; the height of the lower wall regulates the height of the water in the gate.

X Int. 83. Then do I understand you that in order to bring the dam testified to by Anthony H. Trimble within the claims of the Kirk patent, the upstream end of the flume or fore bay must be higher than the down-stream end of the said flume or fore bay?

(Objected to because the witness is not called for the purpose of determining the scope of the claims.)

Ans. I do not see that the height of the walls is mentioned in the patent, and I feel that I am not qualified to express an opinion on the question submitted to me. Thus I would say claim 6 is chiefly concerned in this question, which is as follows: "6. A bear-trap dam having a relieving or open sluice extending from under the gates so as to relieve them from unnecessary pressure, substantially as and for the purpose described." And how he proposes to get rid of the water, there being several practical methods, the inventor is better able to determine than I am.

X Int. 84. Is there anything in the patent of the complainant or in the testimony of Anthony H. Trimble, that even pretends to claim that the outlet shall be of greater capacity than the inlet, as you have testified in your former question is necessary?

Ans. It must certainly have greater capacity. The language of the patent speaks of relieving sluices, and they could not afford any

relief unless their capacity was greater than the space through which the water enters; that appears to me to be the essence of the patent.

X Int. 85. Then do I understand you to testify that in order to bring the dam of the defendant in this case within the terms of the plaintiff's alleged patent No. 268,411, that it is necessary that the outlet from under the dam leaves should be of greater capacity than the inlet?

56 Ans. I would think so, and the model marked "Defendant's Exhibit A," illustrates that it would be necessary to have a larger relieving area for the discharge of water than is provided for filling it.

X Int. 86. Then if the plaintiff, Arthur Kirk, the alleged inventor and patentee, should have stated to you under oath, as he testified November 30th, 1881, in the hearing of interference testimony, whereon said alleged patent, No. 268,411 is claimed to have issued as follows: "I gave preference to another plan, viz: by actual experiment, find the elevation of water under the dam necessary to support it to the desired height, then by simply cutting an opening at that height between the chamber under the dam when raised and the tail race necessary in all these dams to carry off the water from under the dam, when it is desired to lower the dam; I say by simply making an opening between these two chambers, of the same capacity of the inlet valve, which, when opened permitted the water to get under the dam; I concluded it would be impossible for any damage to be done to the dam by the carelessness of the tender, or other causes permitting the inlet gate to remain open. I also had an idea of accomplishing this object by means of floats, levers, etc." I ask if the inventor himself should have testified to you under oath that such was the full scope of his invention, would you have still thought that the dam of the defendant would be within the terms of the claims of said plaintiff's alleged patent? In connection with this interrogatory, I offer in evidence the answer of Arthur Kirk, the plaintiff, to interrogatory 3, of pages 14 and 15, of the interference testimony, Kirk's Record, in the case of Arthur Kirk *vs.* John Du Bois, filed in evidence in this case on the preliminary injunction hearing by and on behalf of Arthur Kirk, the plaintiff.

(Offer objected to, because this testimony has no relation to anything testified to by the witness in his direct examination, and the question is objected to as being improper cross-examination for the same reason.)

57 Ans. Mr. Kirk's testimony referred to appears to have been given several months before he obtained his patent. However he speaks of providing an outlet of discharging capacity equal to the supplying capacity. A discharge of exactly equal capacity to the supply is tantamount to a discharge of greater capacity than the supply for the practical purpose in view. It would be more difficult to obtain a discharging capacity exactly equal to the supply than it would to provide a greater discharging capacity

than the supply. I would still think that the dam of the defendant would be an infringement on the patent of Mr. Kirk.

X Int. 87. Is there anything in the testimony in this case, or in the claims of the alleged patent of Arthur Kirk, the plaintiff, which claims an adjustable outlet, relieving, or open sluice extending from under the gates?

Ans. Yes, sir; I think there is. The plans appear to indicate it to my mind.

X Int. 88. State where in any words or language connected with this case, a claim to the adjustable feature of an open sluice outlet, or water-way, extending from under the gates, is in terms claimed?

Ans. I would understand it to be claimed in lines 110, 111, 112, and 113 of page 2, which are as follows: "At such height as will permit all water which is not required to sustain the gates to escape from under them." Without a careful study of the paper, that is the only place I recall. Only one adjustment seems to be necessary, and having made that, it becomes permanent except in a case of rises in a stream.

X Int. 89. Looking over the testimony of Anthony H. Trimble, would it make any modification in your former answer if he omitted in his description of the defendant's dam to mention cleats upon the side walls of the dam chamber or chute, of sufficient width from said walls to close the openings at the end of the upstream leaf of said dam when at the full height thereby permitted, when in point of fact such cleats actually existed upon the dam with regard to which he testified?

58 Ans. No, sir; it would not.

X Int. 90. Would it make any difference if the dam testified to by Anthony H. Trimble, in this case, in point of fact, had the upper end wall and lower end wall of the flume or fore bay, actually reduced or reducible to the same height?

Ans. I think it would not.

X Int. 91. Have you any interest or compensation in this case, direct or contingent?

Ans. I have not the slightest interest in the remotest degree in the success of this case.

THOMAS P. ROBERTS.

59 In the United States Circuit Court for the Western District of Pennsylvania, November Term, 1886.

ARTHUR KIRK
versus
JOHN E. DU BOIS. } No. 39. In Equity.

Defendant's Testimony and Evidence.

Met pursuant to notice and agreement, at the office of John E. Du Bois, Du Bois, Clearfield county, Pa., to take testimony on behalf of defendant.

Present, counsel for complainant, T. W. Bakewell, also counsel for defendant, T. H. Baird Patterson.

C. F. FULLER, sworn.

Age 47.

Q. 1. What is your occupation now?

60 A. Overseer for Mr. Du Bois.

Q. 2. How long have you been so in charge?

A. Ten years, the 1st of April, in the employ of John Du Bois and John E. Du Bois.

Q. 3. (Shown Exhibit Kirk Map.) Do you know the construction of dam No. 8, as shown on map?

A. I do.

Q. 4. Where is dam No. 8.

A. On Narrows creek, near A. V. R. R.

(Model shown witness of John Du Bois' dam as heretofore offered as evidence in the case.)

Q. 5. Are there any portions of this model that are not in use in dam No. 8?

A. The washout well in the side of the dam opposite the sluice is not in dam No. 8.

Q. 6. Has the washout well anything to do with the regulation of the pressure of the water, or the raising or lowering of the gates?

A. No sir, it is only used for the purpose of washing the sand and mud out.

Q. 7. With the exception of the washout well does the remaining portion of the model correctly represent the construction of the Du Bois dam No. 8?

A. No, sir. The only difference, (not essential) the model is a little longer, has one more bent on upper end of dam. No difference in the essential or working part of the dam.

Q. 8. Look at this model, and explain by reference to it how the No. dam 8 is operated, and especially how you regulate the height of the water, and the pressure of the water under the leaves of the dam?

A. We do that by cutting down the partition, or lower end wall, at the lower end of fore bay, cutting it down about eighteen inches below the height to which they wish to raise the leaves. Below the height of the comb of the leaves.

Q. 9. Will you describe to us, how the water is admitted into

61 the flume or fore bay, and how it is allowed to escape therefrom?

A. It is admitted by a wicket or gate in the upper end of flume or fore bay, and let off by a wicket or gate at the lower end of for bay.

Q. 10. State whether or not, in the construction of dam No. 8, the height of a column of water in the flume or fore bay, is regulated or controlled by the relative adjustment of the gates in the upper and lower end walls of the flume or fore bay, and the height of the lower end wall?

A. It is.

Q. 11. State whether or not the height of the column of water in

the flume or fore bay, controls or regulates the pressure of the water under the gates of the dam?

A. It does.

Q. 12. State how the column of water in the flume or fore bay communicates with the chamber under the gatis of the dam.

A. It communicates by an opening under the gates from wall to wall, the opening is six inches high and extends clear along the flume or fore bay from wall to wall. This communication is through the wall of the fore bay or flume next to the leaves of the dam.

Q. 13. State whether or not the water flows from the flume or fore bay, under the leaves of the dam as long as the wicket in the lower end wall of the flume or fore bay is closed, and the wicket in the upper end wall is open.

A. It flows under until it seeks the level of the water in the pool until it gets up to the top of the lower end wall of the fore bay or flume, it then flows through the flume over the lower end wall into the stream below the dam.

Q. 14. Please state if in the construction of dam No. 8, there is any leakage from the pool above the dam, around the edges of the upper leaf or gate, and also, whether there is any leakage around the lower leaf or gate of said dam?

A. There is. We have always found the leakage greater around the lower gate than around the upper gate, because if we shut
62 the water off from under the gate by wicket (the upper one) the leakage from the lower leaf of dam will let the water off, and let the leaves down, we tried that today on dam No. 8.

Q. 15. Please state whether you have tried similar experiments on other dams constructed in the same manner as dam No. 8, and what was the result?

A. Yes; the leaves would go down in the same manner by leakage from the lower gates.

Q. 16. In trying those experiments in regard to leakage around the gates, state whether or not, before beginning the experiment the leaves or gates were raised to the full height, to which the column of water in the fore bay or flume, would permit them to rise, and also, what effect the leakage around the lower gates produced upon the column of water in the flume or fore bay, after the upper wicket was closed?

A. The water would drop gradually, the gates were up before the experiment was commenced.

Q. 17. Please state whether during your employment by John E. Du Bois and John Du Bois, you have been engaged upon the construction of any other dams similar in their plans of construction to dam No. 8, and if so, state as near as you can the time when the first dam on this plan of construction was built.

A. I have been employed building dams before this dam No. 8, the first one that we built was in the latter part of the summer of 1878.

Q. 18. State whether or not, after the time mentioned in your last answer you were ever present at any conversation between

Arthur Kirk, the complainant in this case, and John Du Bois in reference to dams, and if so state the substance of the conversation as nearly as you can recollect.

(Objected to as incompetent.)

A. I have heard them talk about it after the first dam was built in 1878, the issue was about the undue pressure of water under the gates. Mr. Kirk had one way of relieving the pressure, and Mr. Du Bois, another.

Q. 18. Did Mr. Kirk in your presence ever explain his
63 method of relieving the undue pressure to Mr. John Du Bois, after the time when Mr. Du Bois had built his first dam?

A. Yes sir. Mr. Kirk's method was by building a flume or fore bay, on the opposite side of the dam from the fore bay that had the wicket in, and then he made an opening in the partition next to the leaves of the dam into this other fore bay. He would regulate the water by an opening into the other flume or fore bay, up at a certain height.

Q. 20. Did this Kirk flume or outlet, opening at the other end of the dam let the water into the dam, or did it let it out from under the dam leaves, after the water under the dam had raised to a certain height?

A. It certainly would let it out when it raised to that height. It was only a race to let it out, an opening to let surplus water out from under the leaves.

Q. 21. State whether or not this outlet race of Kirk's would *would* let the water escape from under the dam in a similar manner, as the leakage does around the lower leaf and thus relieve the pressure under the leaves of the dam?

A. The water would run out from under the leaves to the level of the lower part of the opening. After the water run out with the upper wicket closed and lower wicket closed, it would run out to the level of his opening and then the leakage thereafter would have to come through the lower leaves of the gates. The leakage through his opening and through the lower leaf of the dam, both relieve the pressure under the dam.

Q. 22. State whether or not in your last answer, you were answering upon the supposition that the result testified to would be obtained if the Kirk outlet, or tail race was used or applied to the Du Bois improved dam.

A. Yes sir, it would be the same.

Q. 23. Please state what Mr. John Du Bois' reply was to Mr. Kirk's explanation of his outlet.

(All questions relating to this conversation objected to as incompetent.)

A. His reply was that he would cut the partition or lower wall of the fore bay down to a certain height which allows the
64 water to pass out through into the stream below. That would be done in a much cheaper way than what Mr. Kirk's method was, and would have the same effect on the dam.

Q. 24. State whether or not, Mr. Du Bois had prior to the time of this conversation, cut down or lowered the lower end wall of the flume or fore bay at any time?

A. We cut down the first dam we ever built, in the fall of 1878.

Q. 25. Was the explanation that you gave in the answer to Int. 23, as to the method of construction adopted by Mr. John Du Bois for regulating the height and pressure of the water under the leaves of the dam, the explanation given by John Du Bois, himself to Arthur Kirk as the mode which he, (John Du Bois) had already adopted in the dam that he had then already built? Was it, or was it not?

A. That was the substance, he (John Du Bois) described it.

Q. 26. State whether or not you actually superintended the construction of the first dam built by Mr. John Du Bois, on the same plan as the dam No. 8, and also whether you have superintended and been engaged upon the construction of all the Du Bois dams from the first one up too, and including dam No. 8?

A. I superintended the building of the first dam, viz: the finishing up of the first bear-trap dam the dam that was built in 1878. I constructed the most of the dams built since, and have something to do with the construction of all of them, all of the bear-trap dams.

Q. 27. Were all of these dams constructed on the same plan as dam No. 8, as to the method of preventing the pressure of water under the gates to an undue extent?

A. They have been.

Q. 28. State whether or not, at the time of the conversation or conversations in your presence in which Arthur Kirk explained his method to Mr. John Du Bois, made the reply to Arthur Kirk, which you have give us, explaining his, (Du Bois') method
65 of preventing undue pressure under the leaves, Arthur Kirk made any claim that Mr. Du bois' plan or method was his (Kirk's).

A. I never heard Mr. Kirk make such claim.

Cross-examination:

Q. 29. What was your occupation before you became overseer for Mr. Du Bois?

A. I am an iron moulder by trade, and worked at my trade fourteen years before I came to work for Mr. Du Bois.

Q. 30. How did you happen to come into the employ of Mr. Du Bois?

A. I think it was about the year, 1868, I assisted Mr. Du Bois, in building a dam in 1868, and therefore Mr. Du Bois employed me as overseer.

Q. 31. What do you use to wash the sand out, in dam No. 8?

A. We use nothing. We could not put a washout on if we wanted too, for the dam is built at the pier of the bridge.

Q. 32. Have all the other dams of Mr. Du Bois washout flumes?

A. They have not.

Q. 33. How many of Mr. Du Bois' dams have washout flumes, and how many have not?

(Objected to, as not proper cross examination and incompetent.)

A. Eleven that have no washout, and four that have.

(Shown Exhibit Kirk Map.)

Q. 34. Indicate the four dams that have washout flumes.

(Same objection continued.)

A. This map does not locate a dam that has a washout, in my judgement, the map is inaccurate the railroad is not shown. There is one dam located that has a washout in, dam No. 5, also dam No. 7, I recognize these dams after their location is explained by the complainant, Mr. Kirk.

Q. 35. When were dams No. 5 and No. 7 built?

A. They were built last season, about September 1886. No.
66 7 we never have used. No. 5, we have used this spring, and last fall.

(Same objection continued to this question and answer, as to the former ones.)

Q. 36. For what purpose do you use the washout flume?

(Same objection continued.)

A. It is used to wash out the mud and sand that collect under the leaves of the dam. It was never calculated or thought of, to be used for the purpose of regulating the pressure of water under the leaves.

Q. 37. Does this model offered in evidence by the defendant, correctly represent the construction of the washout flume and its location and its connection with the space beneath the leaves of the dam?

(Same objection continued.)

A. It is.

Q. 38. When the dam is in operation, is the wicket at the lower end of the washout flume closed?

(Same objection continued.)

A. It is closed.

Q. 39. When the dam is in operation, by which I mean raised to its full height, does the water flow over the top of the end wall of the washout flume.

(Same objection continued.)

A. It depends upon the height of the wall, in some of them it does, and in some of them it does not.

Q. 40. Name one of the dams where it does not.

A. I think the Kilmer dam.

(No. 6 on map.)

Q. 41. In making the experiment yesterday, when you closed both the wickets at dam No. 8, after the dam had been raised; how long did it take the dam to fall?

A. I did not time it, should think five or ten minutes, more or less.

Q. 42. What other dams have you made the same experiment on, and when?

A. On dam No. 6 yesterday, and on dam No. 8. Have
67 not tried the experiment specially on other dams, but have had them go down from the same cause, leakage around the lower gates.

Q. 43. Who were present at the experiment yesterday?

A. William Gray, John Hauck, Mr. Patterson and Mr. Reese.

Q. 44. On dams No. 6 and 8, have you not cleats fastened to the side wall of the dam extending obliquely, so that when the upper leaf is raised it shall be in contact with the cleats which cover the spaces, if any at the edges of the leaf?

A. I have. The dam No. 8 has cleats on the lower leaf, dam No. 6, only has them in the upper leaf.

Q. 45. In dam No. 8, does the cleat extend the whole length of the lower leaf?

A. No, sir.

Q. 46. Do they on the upper leaf?

A. Yes, sir, the whole length and more.

Q. 47. In your experiment yesterday, with wickets closed, how long did it take dam No. 8 to fall?

A. We did not stay there till it fell completely, it would take it a long while, it fell a foot or sixteen inches while we were there.

Q. 48. How long did it take it to fall a foot?

A. Fifteen or twenty minutes.

Q. 49. How soon after you closed both wickets did the falling of the gates become perceptible?

A. Five or six minutes, more or less.

Q. 50. Have you any object in making the dam leaves so that the water shall leak more at the lower leaf than at the upper?

A. No, sir. We put these packing pieces in to make the lower leaves as near water-tight as possible.

Q. 51. Indicate on the map, the location of the first dam, (bear-trap dam) built by Mr. Du Bois.

A. Nos. 3 and 4.

Q. 52. When was that built?

A. In the latter part of the season of 1878.

68 Q. 53. When were the next dams built?

A. The next season, we built six or seven.

Q. 54. Are dams 3 and 4, in existence now?

A. No sir.

Q. 55. When were they removed and why?

A. They rotted out, and were removed last summer, one of the dams is there yet, we have not used it for a number of years.

Q. 56. Were these dams constructed in all respects like the model, of the defendant?

A. They were not.

Q. 57. How did they differ?

A. They had no washouts for sand. The working parts were

the same. The dams had wooden wickets, the model has metal wickets.

Q. 58. Any other differences?

A. Not in particular. The hinges were different, the practical operation was the same, except the dam had no washout. We had an apron attached to the upper leaf that hung down over the lower gate, we found it would not work and took it off.

Q. 59. How long did you have that apron or third leaf on dams Nos. 3 and 4?

A. Could not say, my recollection is that is was on quite a while, we could not keep it on. It might have been on for a year but I do not think it was on for two years.

Q. 60. When was dam No. 2 built?

A. I think it was built the season after Nos. 3 and 4.

Q. 61. When was No. 1 built?

A. It was built in the spring of the year 1879.

Q. 62. Have you any means of fixing these dates accurately?

A. I came here in the spring of 1877. Mr. Du Boise went to Europe that season, came back in the fall; we were talking about building dams then, but thought it was too late to begin, and put it off till next season.

Q. 63. Have you any memoranda?

A. Have none.

Q. 64. Have you examined Mr. Du Bois' books?

69 A. Have examined the books at the machine shop.

Q. 65. Was Mr. Du Bois (Mr. John Du Bois) personally familiar with the construction of these dams?

A. He superintended them at Nos. 3 and 4 from beginning to end.

Q. 66. Until how recently did Mr. Du Bois continue to use the third leaf on his dams?

A. The last we took off was on the Putnam dam. It was built in 1882 or 1883. Have never put any on since that.

Q. 67. Did you use the third leaf as late as the building of the Monongahela navigation dam?

(Objected to as improper cross-examination and incompetent.)

A. The first dam built there which was not a success had the third leaf on.

Q. 68. What was the purpose of the third leaf?

A. The third leaf was put on to save the lower leaf of the dam from ice and logs. The third leaf was an apron over the lower leaf to protect it.

Q. 69. What would be the effect in dam No. 8, for instance of boarding up the lower end wall of the fore bay and making it as high as the upper end wall?

A. If it was not for the stops or cleats it would flip over, *i. e.* the lower leaf would flip over.

Q. 70. Where was the conversation which you speak of as hearing between Mr. Kirk and Mr. Du Bois.

A. There were a great many conversations about dams. I heard

a great many conversations between Mr. Kirk and Mr. Du Bois, and we have been together, and all talked together about dams. About that time Mr. Kirk was wanting Mr. Du Bois to adopt his (Kirk's) way of relieving the undue pressue of water under the dam; that was very shortly after we built dams Nos. 3 and 4. I would not want to swear positively that I could say just where the conversation took place; it might have been at the dams, or between
70 here and the dams, or it might have been here.

Q. 71. When did you first meet Mr. Kirk?

A. I cannot say positively, I have known Mr. Kirk for a number of years.

Q. 72. Do you remember the occasion of Mr. Kirk's first visit to the Du Bois dam?

A. No, sir.

Q. 73. When was the first successful use of the first bear-trap dam having the lower end wall of the fore bay cut down as shown in defendant's model?

A. In 1878, to the best of my recollection.

Q. 74. In your affidavit on motion for injunction in this case you say that the first dam was built in the fall of 1878 or in 1879, do you not?

A. Yes, sir.

Q. 75. In 1878 how much lower was the end wall of the fore bay than the comb of the dam in any particular dam?

A. There was a plank twelve or fourteen inches wide on lower end wall of the fore bay which we put on or off.

Q. 76. Did Mr. Du Bois think that was a good thing?

A, He did. He thought it was the best thing.

Q. 77. Who first thought of this idea of having an adjustable end wall to the fore bay?

Question withdrawn.

Q. 78. Were you not the first to suggest to Mr. Du Bois the idea of reducing the end walls of the fore bay so as to regulate the water pressure under the leaves?

(Objected to as not proper cross-examination, and incompetent and irrelevant.)

(Counsel for plaintiff insists for negative or affirmative answer.)

A. We took two planks off from the lower end wall of
71 fore bay; took them out to stop a leak, that let the water out from under the dam and stopped all undue pressure. Mr. Du Bois adopted that plan to relieve all undue pressure under gates.

Q. 79. Did you take this plank off or did Mr. Du Bois?

A. I took it off by Mr. Du Bois' orders.

Q. 80. Did you not suggest to Mr. Du Bois the idea that reducing the end wall of the fore bay would be a good way to regulate the pressure of the water?

(Objected to as above.)

A. I showed to Mr. Du Bois the effect that taking off of two planks had on the gate or leaves of the dam. The dam bowed up in the center by reason of extra pressure of the water under the leaves, and when the two planks were taken out the extra water flowed out.

Q. 81. Were you or were you not the first to see and suggest this idea?

(Same objection continued.)

A. I presume that I was the first to see that the water flowed out and let the dam drop down clear from the stop or cleat. I showed Mr. Du Bois, and then he thought that was just what we wanted to get at. We went to experimenting then to see just what point we had to cut the lower end of wall of fore bay, too see where to hold the gates and relieve all undue pressure.

Q. 82. Had this idea ever occurred to Mr. Du Bois befor you suggested it to him?

A. Not that I know of.

(Objection continued.)

Q. 83. In arranging a bear-trap dam of the size of No. 8, do the leaves go up evenly or do they rock from one side to the other?

A. They come up level as a general thing.

72 Q. 84. The witness is shown Exhibit Kirk Sketch A, sheets 1 and 2, and is asked to state whether they correctly represent the defendant's dams, and is asked also to indicate the difference if any.

A. It is the same with the exception of the following differences. The waterway to Du Bois' dam runs nearer the whole way between hinge sills, and the hinges are put on under the leaves of dam. The upper end of fore bay is not shown on this sketch as we have in our dams. Since the first dam and second dam we work our wicket gates vertically instead of by rotation as shown in sketch.

Q. 85. Do you remember a visit of a delegation of the chamber of commerce of Pittsburgh, about the year 1879?

A. I remember that very well.

Q. 86. Did this delegation visit the Du Bois dams?

A. They did. They visited the twin dams; the other dams were not built then.

(The witness here states he wishes to correct his answer to question 53, by stating that the next dams after the twin dams 3 and 4 were not built until 1880.)

Q. 87. Indicate on the map the dams inspected by the chamber of commerce in 1879?

A. Nos. 3 and 4.

Redirect:

Q. 88. State whether or not the lowering of the lower end wall was ever suggested so far as you know to John Du Bois in any other way than by his own observation of the effect which he observed to

have been produced in 1878, on the first bear-trap dam you were then constructing, by the removal of the two plank from said lower end wall.

(Objected to as leading, and as having already been answered.)

73 A. Not as I know of.

Q. 89. State whether or not Mr. John Du Bois, as soon as he observed said effect mentioned in last interrogatory, immediately commenced experimenting with the lower end wall of his flume or fore bay, so as to ascertain the relative height at which to construct same, in order to maintain his bear-trap dam at any desired height by regulating the column of water in the flume or fore bay, so as to prevent any extra or surplus water or pressure from going under the leaves of the dam?

(Same objection.)

A. He went right to experimenting to find the desired height for lower wall of fore bay.

Q. 90. State whether or not on the Du Bois method the water is regulated at the desired height in the fore bay or flume by the height of the lower end wall so as to prevent any surplus or extra water from going under the leaves of the dam, or does it allow the surplus water to go under the dam and then allow it to flow out afterwards.

(Same objection.)

A. The height of the water in the flume is regulated by the height of the lower end wall of the fore bay. After the water gets up a certain height it passes right on through over the lower wall of fore bay out into the stream below.

Q. 91. State whether or not, after the water reaches the height of the lower end wall of the fore bay, the water in the flume above that level passes right on into the stream below without going under the gates of the dam at all.

A. It does after the gates are filled.

Q. 92. Has the washout outlet or flume ever been used, or was it ever designed to in any way affect the regulation of the surplus water or pressure under the leaves of the dam? and does it

74 make any difference on the practical use of said outlet, well, or sand flume what the height of the end wall is in relation to the upper wall of the flume or fore bay?

A. It was never built, or was it designed to regulate any undue pressure under leaves of dam; it would make no difference how high you would build the wall of lower end, because the lower wall of fore bay regulates all undue pressure.

Q. 93. State whether or not in point of fact the end wall of said washout or sand flume is higher or lower on the different dams where it is used, just as it happens, and whether it has any designed relation to the construction of the other parts of the dam.

(Objected to.)

A. It has no designed relation and is not necessary.

Q. 94. State whether or not the upper leaf of the Du Bois dam is constructed with or without the packing strip, such as is used on the lower leaf, or in other words, in actual construction is there more or less leakage space around the upper leaf of these dams than around the lower leaf?

A. There is no packing strip on the upper leaf that I know of. There is greater leakage space in the upper leaf than in the lower.

Q. 95. State why it is, in your opinion, that notwithstanding these precautions, the water leaks out faster through the lower leaf than it comes in around the upper leaf.

A. Because the whole pressure is against the lower leaf.

Q. 96. State whether or not after the dam gates went down in No. 8 and No. 6, by reason of leakage when we were experimenting yesterday, they still continued to sink by reason of leakage after they had got some inches below the cleats or stops.

A. They did continue to sink.

Recross-examination:

Q. 97. How soon after the discovery of the reduction of
75 the end wall of fore bay, did you begin your experiments to determine the proper degree of reduction?

A. We began right straight.

Q. 98. When did the experiment terminate?

A. It terminated right there, for we came to the conclusion what we wanted.

Q. 99. How long after the completion of the dam was it when you began to experiment?

A. We had not quit working on the dam when we began to experiment. We were still working on the automatic arrangement.

Q. 100. Did you abandon the automatic arrangement because it was unsuccessful?

A. We did.

Q. 101. What time of the year was it when you took out the automatic arrangement?

A. We never took it out till the dam was torn to pieces. We detached the automatic arrangement from the lever to the wicket.

Q. 102. When did you detach the automatic arrangement—what time of the year?

A. Late in the fall of 1878, as near as I can recollect.

C. F. FULLER.

SIDNEY FULLER, sworn.

Q. 1. State residence, age, and whether you are any relation to the last witness, C. F. Fuller; also your business?

A. Residence, Pittsburgh; age, 66 past; business, lumbering; am no relation to C. F. Fuller as I know of.

Q. 2. State whether you know Arthur Kirk, the complainant, John E. Du Bois, the defendant, and John Du Bois, the deceased uncle of John E. Du Bois?

A. I have been acquainted with John Du Bois 20 years, John

E. Du Bois probably 10 years. Think I saw Mr. Kirk about 1877.

76 Q. 3. State, if you can recollect, the first improved bear-trap dam constructed in Sandy Lick creek by John Du Bois?

A. My recollection is that the first one was constructed at the mill, and the next one about two miles above there. When I speak of the mill, I mean Du Bois' big mill.

Q. 4. Have you known the different dams constructed since the first one up to the present time by John Du Bois and John E. Du Bois?

A. These dams that I speak of were constructed by John Du Bois. They were in Sandy Lick creek or on the Luthersburg branch.

Q. 5. Do you remember when the chamber of commerce excursion came up here to look at Du Bois' dam?

A. I do; as near as I can recollect it was in December, 1879; the 23d day of December.

Q. 6. State, if you can recollect, how long before the time that excursion came up was it when John Du Bois built his first improved dam over in the creek here?

A. My recollection is that it was over a year.

Q. 7. Please describe the mode of construction of all these Du Bois dams that you have examined, and how they operate with regard to regulating the height of the water?

A. I saw some of the dams when Mr. Du Bois was building. I had quite a quantity of logs to drive, and logs in company with Mr. Du Bois, and used the dam. The floor is put down tight, timbers are laid across the creek, and the floor put upon them. There is pileing to prevent the water from washing under the dam, they plank up a separate flume and chute, the apron or leaves are put on and fastened above and below, then the pool is planked up, and the chute is planked up, in the partition there is a gate which lets the water under the leaves and a gate to let it out. When they raise a head they shut the lower gate and open the upper one, which would cause the leaves to raise, and when they raise as far as wanted for a head of water, there is a stay to hold the leaves raising higher, and then let the water pass out the lower

77 end of the flume.

Q. 8. How was the lower end wall of the flume arranged so as to let the water pass out when the dam had reached the desired height?

A. Either by taking a board or plank off the lower end wall, or putting one on so as to control the water in the dam at a given height. When we want to drive logs over we close the upper gate and openthe lower one. Mr. Du Bois gave me the idea of this dam five yearsbefore there was a dam built here, and when the dams were built I found it was just what he (Mr. Du Bois) said it would be.

Q. 9. When you speak of the upper gate, where is the upper gate located?

A. In the upper end wall of the flume.

Q. 10. When you speak of the lower gate, where is the lower gate located?

A. In the lower end wall of the flume.

Q. 11. State whether or not when you speak of the stay to keep the apron or leaves of the dam from raising beyond a given height, you mean such a stay or cleat as is shown on defendant's model?

A. Yes, sir.

Q. 12. Omitting from this model this washout or sand well at the far side of the dam from the flume, does the defendant's model substantially show the dam as originally constructed by John Du Bois?

A. Yes, sir, with the exception of the washout or sand well, and is also the same as explained to me by John Du Bois five years or more before the first dam was built.

Q. 13. State whether or not other dams built by John Du Bois, since the first one, were constructed upon the same plan as the first one, and as shown by this model, so far as you have seen?

A. They are all constructed alike, with the exception of the washout, so far as I have seen.

Q. 14. State whether — not, in the fall of 1879, before the
78 chamber of commerce excursion came up to Du Bois, you had any conversation or conversations with Arthur Kirk, the complainant, in which he stated to you his relations to and arrangements with John Du Bois, in connection with his dam or dams? What were they?

A. A short time before the excursion I met Mr. Kirk in Pittsburgh. He told me they were going to have an excursion to Du Bois for a party to come and examine the Du Bois dam. The men were coming up to examine the dam for the purpose of having it put in use in the Ohio river at Davis island, and for me to get the leading men if I could, from Allegheny to come, and Mr. Du Bois requested the same. I did speak to Hugh Fleming, president of the Third National Bank of Allegheny, also to Hugh McNeil, James Crawford, Frank Wren, councilmen of Allegheny. Mr. Fleming and Mr. McNeil did not come, as they could not get away; the others did come. There were some 25 or more came. We went to the dam and examined it, and they all pronounced it a success with the exception of one or two that were connected with the Davis Island dam.

Q. 15. State whether or not, about the time of that excursion, Arthur Kirk made any statements to you as to any arrangement he had made with John Du Bois, in regard to Kirk's trying to secure the introduction of Mr Du Bois' dam on the Ohio river, and the Monongahela river, and if so what was the substance of those statements.

A. I understood from Mr. Kirk and Mr. Du Bois both that Mr. Kirk was employed by Mr. Du Bois, to get the Du Bois dam introduced at Davis island, Ohio river. Mr. Du Bois requested me to help Mr. Kirk to have the dam introduced and I did.

Q. 16. State whether Mr. Kirk told you about that time anything with regard to how his services were to be rewarded by Mr. Du Bois?

A. I understood when Mr. Kirk had succeeded in getting the dam in, he was to have a nice thing of it from Mr. Du Bois.

79 Q. 17. How long a time—up to how late a date did your intercourse with Arthur Kirk in regard to the Du Bois dam extend?

A. It might be two months, or six months, or a year after the excursion.

Q. 18. State whether or not during all the conversations of Arthur Kirk with you in 1879 and 1880, Arthur Kirk ever made any claim to you that he had a patent on the Du Bois dam, or any conflicting claim?

A. No, he never said to me that he had a patent or conflicting claim on the dam. He said he was working in the interest of John Du Bois.

Cross-examination:

X Q. 19. In December, 1879, Mr. Kirk and Mr. Du Bois were very friendly, were they not?

A. I believe so.

X Q. 20. How much did Mr. Du Bois offer to give you for your services in assisting Mr. Kirk to introduce his dam?

A. He did not offer to give me anything. If he got the dam in there he wanted me to help him put it in.

X Q. 21. Were you to receive any compensation for helping him put it in?

A. He did not tell me what he would give me. I did not agree to go.

X Q. 22. You agreed to help Mr. Kirk introduce the dam?

A. I did.

X Q. 23. And the only compensation you received for that was a contingent interest in a dam contract?

A. I had no special interest in the dam further than to help Mr. Du Bois and Mr. Kirk, and charged nothing for it in relation to the time in 1878, 1879 and 1880.

X Q. 24. How was it that you agreed to do this work for nothing?

80 A. Mr. Du Bois and I had lumber in partnership, he was sawing for me, he accommodated me in a good many ways, and I accommodated him whenever I could. I was with Mr. Du Bois a great deal at that time.

X Q. 25. You did it then because you were a friend to him?

A. I did it in relation to business.

X Q. 26. Just what interest did Mr. Kirk say he was to have in the dam if it was adopted?

A. I do not know as he ever told me what he was to have.

X Q. 27. Was Mr. Kirk's contract with Mr. Du Bois in writing?

A. I do not know.

X Q. 28. Did Mr. Kirk receive any money from Mr. Du Bois for his services?

A. I never saw him receive any.

X Q. 29. How much was Mr. Kirk to receive in cash in the event of the introduction of the dam?

A. I do not know.

X Q. 30. Tell me the position with relation to the saw-mill, of the dam visited by the chamber of commerce in 1879?

A. It was about a mile, or a mile and a half from the big mill to the dam.

X Q. 31. Have you had any recent conversation with Mr. C. F. Fuller?

A. No, sir.

X Q. 32. You say this model that defendant exhibits represents the dam described to you by Mr. Du Bois five years or more before 1878, with the exception of the washout. Did he explain to you the reducing of the lower end of the fore bay?

A. Yes, sir, on that principle.

X Q. 33. When was it that Mr. Kirk told you he was in the employ of Mr. Du Bois?

A. It might have been six months, or two months before the time of the excursion. It is a long time ago. It might be two months, or it might be longer before the excursion. I did not know of any
81 conflict between Mr. Du Bois and Mr. Kirk in relation to this dam until I saw the notice of the suit in the U. S. court about a year ago.

(The latter part of the answer is objected to as not responsive.)

X Q. 34. How many dams were at Du Bois when the chamber of commerce visited the place?

A. I think there were two, one below the big mill and one a mile or more above the big mill.

X Q. 35. Were both these bear-trap dams?

A. That is my recollection, but I would not be so sure as to the one below the mill, because I used them I feel quite sure about the one above the mill.

SIDNEY FULLER.

J. J. DRUMMOND sworn.

Q. 1. State your residence, age and occupation.

A. Age, 60 years; residence, Punxsutawney; occupation carpenter.

Q. 2. State whether or not you worked on the first improved bear-trap dam built by John Du Bois on his property?

A. I did.

Q. 3. State what arrangement of the lower end wall of the flume or fore bay was made on that dam, and also whether that arrangement was made under the direction of John Du Bois?

A. He had a loose board or plank to put on or take off to save the gates. It was below the lower wicket. It was all made under his direction.

Q. 4. Witness shown defendant's model, and asked to explain where it was that the loose plank was put on or taken off?

A. Witness points out the lower end wall of the flume or fore bay.

It was on the lower end of the flume or fore bay that the loose plank was put on and taken off.

Q. 5. After the first dam on which you worked, was built, did you assist in constructing any other improved bear-trap
82 dams under Mr. John Du Bois' direction, and if so, did they or did they not have the lower end wall of the flume or fore bay constructed in the same manner as the first dam which you testified in regard to?

A. They were all just alike after the first one.

Cross-examination:

X Q. 6. How many dams have you built since the first?

A. Seven, and I framed one for the tunnel which I did not put in.

X Q. 7. Have any of these been built by John E. Du Bois?

A. No, sir, they were all built by John Du Bois.

J. J. DRUMMOND.

D. D. MOORE sworn:

Q. 1. State your age, residence and occupation.

A. Age, 45; residence, Du Bois, and occupation, framer and carpenter.

Q. 2. State when the first improved bear-trap dam was built by John Du Bois, deceased.

A. As near as I can recollect, it was in 1878.

Q. 3. Did you work on that dam?

A. Yes, sir.

Q. 4. Where was it?

A. On Sandy Lick creek. We call it the Joe Hand dam at foot of lane.

Q. 5. How far is it from the big mill?

A. Something over a mile.

Q. 6. Do you recollect when the excursion came up from Pittsburgh?

A. I remember the time, but not the date.

Q. 7. Do you remember what dam they visited?

A. I do not, but I think that dam was built at the time they were here.

83 Q. 8. How long before the chamber of commerce excursion came up here was it that this dam was built?

A. I think it was about a year.

Q. 9. Do you remember when that dam was finished, whether there was any arrangement of the lower end wall of the flume or fore bay, and if so, what was it, and what was the object to be attained by that arrangement?

A. This lower end wall of the fore bay was left 18 or 20 inches lower than the height of the comb of the dam. The object of that was to keep the gate from throwing up or raising too high.

Q. 10. What was the effect of the lowering of that wall?

A. To let the water flow over the end wall, *i. e.*, the lower end wall, so that the gate would not come up any higher.

Q. 11. When you say the gate, you mean the leaves or gate of the dam in the chute?

A. Yes, sir.

Q. 12. In the construction of that dam did you reduce the upper end wall of the flume, or did you board it up?

A. We boarded it up.

Q. 13. If you omit from this model (defendant's), the washout or sand flume, does the rest of the model substantially represent the construction of this first dam that you have been talking about, or where does it differ?

A. With the exception of the sand flume it does not differ.

Q. 14. Who was working with you on this first dam?

A. Mr. Drummond was my boss; also Charles Loring and Mr. C. F. Fuller.

Q. 15. After this first dam did you work on any of the other dams that have been constructed since?

A. Yes, sir.

Q. 16. Were these other dams constructed on the same plan as the first one?

A. Yes, on the same principle, with the exception that the wicket gates on the first dam turned, and since that they have been made to raise.

84 Q. 17. Do you know the construction of dam No. 8?

A. I helped to put it in.

Q. 18. Is it constructed on the same principle as the first dam?

A. I think it is.

Q. 19. State whether or not all improved bear-trap dams, in whose construction you have taken any part, on the Du Bois property, were built during the lifetime of John Du Bois, deceased, and under whose directions, and if any were not so built mention them?

A. They were all built under Mr. Du Bois' own direction, and during his life.

Cross-examination:

X Q. 20. What is you present occupation?

A. I am not at present employed anywhere. I am waiting for Mr. John E. Du Bois' direction to go to work.

X Q. 21. What work did you do on the dam which you say you built in 1878?

A. I helped to frame it.

X Q. 22. What does the framing consist of?

A. It consists of boring, mortiseing and chiseling.

X Q. 23. Did you assist in putting in the gates?

A. Yes, sir, I did.

X Q. 24. In what condition was the dam when you left it?

A. In working condition.

X Q. 25. When you finished it, was the lower end wall of the fore bay made about 18 inches lower than the comb of the dam?

A. Yes, I think it was. I cannot remember the exact height.

X Q. 26. Was that the way that the dam was intended to be built when you were instructed to build it?

A. We had our instructions every day from Mr. Du Bois.

X Q. 27. Are you sure that it was not built with the lower
85 end wall of the fore bay boarded up, and afterwards changed?

A. Not to my knowledge.

X Q. 28. Wouldn't you have known if such a thing had been done?

A. I suppose I would have known it. Whatever work was to be done on the dam we did it.

X Q. 29. How long after the building of the 1878 dam were the next dams built by Mr. Du Bois?

A. I do not remember how long.

X Q. 30. How many dams have you assisted in building for Mr. Du Bois?

A. Six or seven.

X Q. 31. Did not the dam which you say was built in 1878 have some other arrangement for regulating the height of the leaves than the one you have mentioned?

A. Not to my recollection.

X Q. 32. Did it not have an automatic float?

A. I cannot tell. If it had it was after I left it.

D. D. MOORE.

JOHN HORNER sworn.

Q. 1. State your age, residence and occupation?

A. Age, 47; residence, Du Bois; occupation, superintendent of the mills.

Q. 2. State whether or not all the Du Bois improved bear-trap dams came into your charge, from the first one up to the present time, when they were finished and ready for use?

A. All of them as far up as the first one that was built at the foot of the lane.

Q. 3. How many of them are they that came under your charge?

A. Five.

Q. 4. State what was the construction of the first one that was built, in regard to the lower end wall of the flume or fore bay?

86 A. The lower end was lower than the upper end.

Q. 5. What was the object or effect of constructing the lower end wall of the flume or fore bay lower than *than* the upper one?

A. To relieve the gates of unnecessary pressure.

Q. 6. State whether or not, by the term gate, in your last answer, you mean the leaves of the dam in the chute?

A. I do.

Q. 7. State whether or not the other dams that came under your charge were constructed in the same way as the first one?

A. They were to the best of my recollection.

Q. 8. Witness shown defendant's model, asked to state whether or not this model, (omitting the washout or sand flume at the far

side of dam from the fore bay), correctly represents the construction of the dams that came into your charge?

A. It does.

Cross-examination:

X Q. 9. You are now in the employ of the defendant in this case, are you not?

A. Yes, sir.

X Q. 10. You stated a moment ago that there was one of the dams in which you were not very familiar. Which was it?

A. No. Five.

JOHN HORNER.

JOHN HAUCH sworn:

Q 1. State age, occupation, and residence?

A. Age, 29; residence, Du Bois; occupation, carpenter.

Q. 2. State whether or not you were present yesterday at dams No. 8 and No. 6, (Kilmer dam), when experiments were tried by shutting the upper gate in the fore bay or flume, and the lower gate in the fore bay or flume, after filling up the dam and flume with water to the height of the lower end wall of the fore bay, in
87 order to see what effect the leakage around the gates would have on the leaves or gates of the dam, and if so, state what the effect was on the leaves or gates of the dam, produced by the leakage?

A. Yes, sir, I was there. We closed the gates; when it filled up we closed the upper gate. The leakage on the lower leaf left the gates down.

Q. 3. Did you notice what effect the leakage produced on the water in the fore bay or flume of the dams?

A. The water in the fore bay went down just with the gate.

Q. 4. In the construction of those dams, is there any difference in regard to the lower end wall of the flume in height, from the upper end wall?

A. Yes, sir, the lower end wall is cut down lower.

Cross-examination:

X Q. 5. Are you in the employ of Mr. John E. Du Bois?

A. I have been working for Du Bois & Van Tassel.

X Q. 6. Is John E. Du Bois a member of that firm?

A. That *it* is the way I understand it.

Redirect:

Q. 7. Who manages the business of Du Bois & Van Tassel Brothers, and employs the men and is active manager of everything?

A. Mr. Van Tassel does the hiring. He does all the business around the tannery so far as I know. I never saw Mr. Du Bois attending to any business at the tannery.

JOHN HAUCH.

G. W. EDMUNDS sworn.

Q. 1. State age, residence and occupation.

A. Age, 50 years; residence, Du Bois, and occupation, logman.

88 Q. 2. State whether or not in driving the logs in the part of the creek near the mills, you have to operate a certain number of the John Du Bois improved bear-trap dams, and if so, how many do you have to operate?

A. Two dams, No. 1 and No. 2.

Q. 3. State how those dams are constructed in regard to the lower end wall of the flume or fore bay?

A. The lower end is from 12 to 15 inches lower than the upper end. In case of low water we put plank on the lower end to correspond with the upper end. If the water raises we take the plank off again, and let the water flow right on through the flume, over the lower end wall, and in that way relieve the pressure under the leaves of the gate.

Q. 4. Witness shown defendant's model and asked, omitting the washout or sand flume, does the model correctly represent the construction of the dams of which you have charge of and operate, in regard to which you testified?

A. Yes, sir.

Cross-examination:

X Q. 6. How long have you been in the employ of John E. Du Bois and John Du Bois?

A. Eleven years next July.

X Q. 7. What work were you engaged in when you first came here.

A. I worked for Mr. McIntosh, who was Mr. Du Bois' foreman, in the woods.

X Q. 8. How long were you engaged in chopping, &c?

A. Very near two years. Then I went to work sorting logs for the mill.

X Q. 9. What kind of dams did you work on?

A. An old dam with hoist gates; it was not a bear-trap dam.

X Q. 10. How long did you work at these?

A. I do not recollect exactly.

89 X Q. 11. Do you know when dams Nos. 1 and 2 were built?

A. I could not tell.

X Q. 12. Were they the first bear-trap dams that were built on the Du Bois property?

(Objected to as not proper cross-examination.)

A. I could not tell.

X Q. 13. In whose employ are you now?

A. John E. Du Bois.

GEORGE W. EDMUNDS.

W. R. GRAY sworn.

Q. 1. State age, residence and occupation?

A. Age, 31; occupation, carpenter; residence, Du Bois.

Q. 2. State whether or not you were present yesterday at the experiment tried at dam No. 8, in Narrows creek, and at the Kilmer dam, No. 6, on Sandy Lick creek, when after filling the fore bay or flume and the dam gate to the height of the lower end wall of the fore bay or flume, the wicket gates in the fore bay were both closed in order to see what effect the leakage around the leaves or gates of the dam would produce upon the leaves or gates of the dam, and if so, what was the effect produced by such leakage?

A. Yes, sir; the gates went down.

Q. 3. State whether or not the gates kept on going down — they had sunk away from the cleats?

A. They still kept on going down.

Q. 4. State also what effect, if any, you noticed was produced by such leakage on the height of the water in the fore bay or flume?

A. It went down the same as the gates.

Q. 5. In your opinion what was the cause of the gates going down and of the water going down in the flume?

90 A. The water went out faster around the lower gate than it came in at the upper gate.

Q. 6. State whether or not all the dams in the Sandy Lick creek and Narrows creek, on the Du Bois property, of which you have personal knowledge, are constructed on the same general plan, with the exception of the washout or sand flume?

A. All that I have seen.

Q. 7. In all these dams that you have seen, state whether or not the leakage is greater around the lower leaf of the dam or the upper one?

A. The lower leaf.

Q. 8. State what in your opinion, is the reason that the leakage is greater around the lower leaf than around the upper one?

A. Because the lower leaf is the lower part of the dam, and the upper leaf is merely a float. There is no water below the lower leaf to prevent the leakage around the lower gate.

Q. 9. State whether or not you have seen the first dams that were built in Sandy Lick creek, down towards the mills, as well as the dams that have been built since on Sandy Lick creek and Narrows creek, McCracken run and Gravel Lick run, and Luthersburg branch. Also state whether or not all these dams that you have examined have the same arrangement of the lower end wall of the flume or fore bay. Also state what that arrangement of the flume of the lower end wall is, and what is the object?

A. All that I have seen. The lower end wall is cut from 12 to 18 inches lower than the upper end, the object being of letting the undue pressure out under the gates.

Q. 10. When the water raises to the height of the lower end wall of the flume or fore bay, what does it do?

A. It runs over the lower end wall.

Q. 11. When the water commences to flow over the lower end wall, then that prevents any more surplus water going under the gates, does it not?

A. It does.

Q. 12. Defendant's model shown witness, and he is asked
91 if, omitting the washout or sand flume, the remaining portion of the model correctly represents the construction of all the dams on the Du Bois property that he has examined?

A. Yes, sir.

Q. 13. State whether or not the washout or sand flume has any other connection, or use in connection with the dams where it is attached, except to be used occasionally when needed to wash out the sand or mud accumulating in the chamber under dam leaves?

A. No, sir.

Cross-examination:

X Q. 14. When was dam No. 8 built? Is it an old dam or new dam?

A. It is an old dam.

X Q. 15. Is No. 6 an old or new dam?

A. It is an old dam.

X Q. 16. After use extending over some time the parts of a bear-trap dam are apt to become worn are they not? I mean worn by sand, friction, &c.?

A. To some extent.

X Q. 17. Do you consider the overflow at the end of the fore bay to be a valuable adjunct to the bear-trap dam?

A. It is.

X Q. 18. What would be the effect if you did not have it?

A. You could not stop the gates.

X Q. 19. In making your experiment yesterday did you wait until the water began to run freely over the top of the upper leaf before you shut the upper wicket?

A. We did not wait; we shut it down before the water run over the top of the dam gates.

X Q. 20. You are now in the employ of John E. Du Bois, are you not?

A. No, sir, not at present.

X Q. 21. In your affidavit for motion for a preliminary injunction in this case, you testified that you were in the employ
92 of John E. Du Bois, did you not?

A. I did, but I am not in his employ now.

X Q. 22. What are you doing now?

A. I am not doing anything.

X Q. 23. How long since you left John E. Du Bois' employ?

A. About six weeks.

X Q. 24. Do you expect soon to be employed by him?

A. No, sir.

W. R. GRAY.

FRANK M. REESE, being duly sworn, deposes and says as follows in answer to interrogatories propounded to him by T. H. BAIRD PATTERSON, counsel for John E. Du Bois:

Q. 1. State your name, age, residence and occupation.

A. Frank M. Reese; 34 years; residence, Allegheny City, Pa., occupation, attorney-at-law and metallurgical and mechanical expert.

Q. 2. State what, if any, experience you have had as an expert in patent cases.

A. I have been frequently called during the last 11 years to testify as mechanical expert in patent and other cases.

Q. 3. State what experience you have had in the examination of mechanical structures and in comparing the same with inventions described and claimed in letters patent.

A. During the last ten or eleven years I have examined hundreds of different mechanical structures and compared the same with patented inventions for the purpose of ascertaining similarities in mechanical construction, in principles of operation, and in results intended to be secured by the use of such devices. Ordinarily these examinations and comparisons have been made in giving opinions on questions of infringement. A considerable number have been made in qualifying myself to act as expert in patent cases.

Q. 4. State whether or not you have examined and are familiar with the alleged invention of Arthur Kirk, as described in
93 letters patent No. 268,411, and claimed in the sixth claim thereof, and if so, state generally the object, the principle of operation, the construction, and result intended to be attained thereby.

A. I have examined said letters patent and am familiar with the invention described therein and covered by the sixth claim thereof. As described the invention consists of an open sluice, water-way or tail race, so arranged relatively to the dam, that the water which is not required to support the leaves, will escape and so relieve the dam of all unnecessary pressure. Two forms of construction are shown to accomplish this object. One construction, as shown in figure 2, is an open sluice, water-way or tail race, indicated by the figures 38. This sluice is arranged at such relative height from the floor of the dam as will permit the excess of water to flow out from under the leaves into the pool below, when the leaves of the dam have been arranged to a fixed or predetermined height. The sluice is located in one of the end walls of the dam, extending out from below the leaves when the latter are raised, down to the pool below the dam. A modified construction of the sluice (38) is shown by figure 4, where the outlet (39) in the wall is below the level of the water, the latter passing through the outlet (39) into a fore bay or well (40) and thence over the bridge (41). The bridge (41) determines the attitude to which the water must rise under the leaves of the dam before any excess is allowed to flow into the pool below. Hence both constructions described and shown in Kirk's patent are

of such nature that the excess of water can only be carried away from under the leaves at a given or fixed height. Hence Kirk's dam cannot, or is not adapted to be raised to different heights. As I understand this invention, Kirk's object appears to be this: he intends to admit under the leaves of the dam, water from the pool above the dam directly and without any means for regulating the pressure or height of the column of water previous to its admission under the leaves. In his dam, as in the use of the old well-known type of bear-trap dams, the full head of the water from the
94 pool above the dam comes directly into the chamber under the gates or leaves. Kirk's object is to relieve any excess of pressure which might come upon the leaves from the admission of an excessive head of water under them. This he accomplishes by providing means for carrying off into the pool below, the excess of water, which, as in the case of the old bear-trap dams, he admits into the chamber under the gates or leaves of the dam.

The principle of operation embodied in this invention appears to be to obviate, as far as possible, an evil that Kirk cannot prevent. As a surplus of water necsssarily enters the chamber beneath the wings or gates of the dam, Kirk provides means, *i. e.*, an open sluice way, extending from under the leaves down to the pool below, to carry off this surplus after the water has reached a certain height under the leaves. The object is to relieve the leaves of the dam from excessive pressure by carrying off the excess of water from under the leaves.

(Witness shown "Exhibit Kirk Map, W. B. C. N. P., October 4, 1886.")

Q. 5. State whether or not you have examined and are familiar with the general principles of construction and mode of operation of the improved Du Bois bear-trap dam No. 8, shown on this "Exhibit Kirk Map," and if so, compare the same with the invention claimed and set forth in Kirk's patent, under the sixth claim?

A. I have examined Dam No. 8, whose position is set forth in "Exhibit Kirk Map," by figure 8, and understand the general principles of construction and operation of said dam. It is a bear-trap dam, consisting essentially of two gates or leaves, each hinged at one of their ends to a floor or foundation and so arranged relatively to each other that the inner end of the forward leaf overlaps the inner end of the lower leaf when the leaves are sunk down against the floor or foundation. These leaves work between side or end walls of the dam, formed of plank. A sluice or fore bay is
95 arranged at one side of the dam. This sluice is provided with wickets at its front and at its lower end. The lower end wall of the sluice is built up to a height about 15 or 18 inches below the height it is intended to raise the comb of the dam. An aperture extends along the inner wall of the sluice through into the chamber below the leaves or gates of the dam. This aperture is located at or near the level of the floor of the sluice, and extends as near as I could judge almost entirely the length of the chamber under the leaves. There are no other means attached to the dam

to regulate its operation except the sluice I have mentioned. The rear end wall of this sluice is adjustable in height, so that by removing or replacing an upper board or boards thereof, the height of the rear end wall may be regulated as desired. The operation of the dam is as follows: The leaves or gates being down the lower end wall is adjusted to any height which will give sufficient water to the flume when the upper wicket is opened, to raise the leaves of the dam to any desired height. When the upper wicket is opened, the water from the pool above enters the flume, rises therein, until it attains the height of the lower end wall. A portion passes through the lateral aperture in the inner wall of the dam into the chamber beneath the gates or leaves, and fills or rises within this chamber until it is of equal height with the column of water in the flume. When it is desired to lower the dam the upper wicket is shut, and the wicket at the lower end of the flume is opened. As compared with the invention described and claimed in the sixth claim of Kirk's patent, I think it is different, not only in mechanical construction, but also in principle of operation. The objects of the two inventions are in a manner different. The method of operation is different, and the only points of similarity between the two are, first, both dams are of the old bear-trap type of dam; second, both constructions are intended to achieve the same kind of result. The Du Bois dam differs essentially from the Kirk dam in this: Unlike Kirk, Du Bois never admits an excess of water under the leaves or gates of the dam, hence no necessity whatever exists
96 in the Du Bois dam for the use of any open tail race or flume extending out from under the leaves to the pool below. As Du Bois regulates his water in advance of the dam and only permits the requisite water to enter under the leaves that is required to raise them to any given height, there is no surplus water to carry away from this chamber. On the other hand, as Kirk's dam, like other previous bear-trap dams, admits an excess of water under the leaves, the open flume, tail way or race is used, and must be used in Kirk's dam, or it would be liable to the same excess or pressure that was apt to come upon the leaves of such dams. The difference—the marked difference between the Du Bois and Kirk dams, is this: Du Bois prevents at all times, by his construction, any excess of water and consequently any excess of pressure from coming into the chamber under the leaves of the dam. Du Bois' idea is to prevent; Kirk's is merely to cure.

Q. 6. State whether or not you have examined the affidavit of T. P. Roberts, originally made in the case of Arthur Kirk *vs.* John Du Bois at No. 15, May term, 1886, U. S. circuit court, and on motion for preliminary injunction in that case, which was afterwards filed and used on motion for preliminary injunction in this case, and also whether you have examined the testimony of said T. P. Roberts, given in this cause on behalf of the complainant; and if so, do you coincide with his views as to the effect of leakage through the apertures along the edges of the leaves of the dam?

(Consideration of the affidavit is objected to as incompetent in this case.)

A. I have examined the affidavit and testimony and think that I coincide with Mr. Roberts' views as to leakage, indicated in the following portion of said affidavit. "Referring to the drawing marked 'sketch of bear-trap dam,' in Arthur Kirk's said affidavit, the dam was customarily raised, before the date of Kirk's alleged invention, by the admission of water from a fore bay or well,
97 through wickets, under the dam leaves or gates. The area of resistance presented by the leaves to the hydrostatic pressure of the water in the fore bay is enormous, relatively to the weight of the leaves, and upon the admission of water they rapidly respond to the pressure and rise to an upright position. They could be checked when they had risen to a proper position either by turning the valves in the upper wall of the fore bay to diminish the flow of water into the fore bay from the pool above, or by partially closing the valves controlling the wickets leading from the fore bay into the space between the gates. These modes, however, are impracticable or at least not economical, because they require the continued and careful attention of a man to the valve. If they should become closed or choked in any way to cut off the supply of water, the dam would fall."

Mr. Roberts does not in express terms herein, say anything about the relative leakage of the upper and lower leaves, yet he states if they should become closed or choked in any way the dam would fall. By "they" he refers to valves becoming choked to cut off the supply of water to the chamber under the leaves. The gates could only fall on account of the leakage of the lower leaf being in excess of that of the upper leaf. Hence the witness must have been fully aware that the relative amount of leakage was greater in the lower than in the upper leaf. I coincide with this view. Consequently I do not and cannot coincide with the directly opposite view on this question of leakage, which is presented in said Roberts' testimony.

Q. 7. Leaving out of consideration the affidavit mentioned in the last interrogatory, after an examination of the testimony of T. P. Roberts, state whether or not there seems to be any inconsistency between said testimony, up to and including his answers to interrogatories 22 and 23, and his testimony subsequent thereto; and also what your views are with regard to the relative amount of leakage around the upper and lower gates of dam No. 8, and its effect upon said dam after it has been raised to the predetermined height fixed, and the wickets in the upper and lower end
98 walls of the sluice or fore bay have been both closed?

A. Mr. Roberts' testimony seems to be inconsistent in regard to leakage, as he states in answer to interrogatory 22 that the current would be nearly always inward, carrying water to make up the loss from leakage. Under the conditions he refers to, that could not be the case unless the leakage was greater from the lower than the upper leaf. In his subsequent testimony, Mr. Roberts seems to entertain an opposite view as to the relative amount of leakage between the edges of the upper and lower gates, that is, between the edges and the walls of the dam. My own personal view of this matter is that the leakage from the lower gate would always

be largely in excess of that which enters between the edges of the upper leaf and the sides of the dam. When the leaves of the dam are raised, the column of water in the leaf chamber seals up or tamps the openings between the edges of the upper leaf and the side walls of the dam. Any leakage which takes place at the edges of the upper leaf is opposed by the water between the leaves. As the height of the water in the pool above exceeds the height of the column of water under the leaves, a certain amount of leakage will occur through the crevices along the sides of the upper leaf, but as there is little, if any, opposing influence ever present at the outer edges of the lower leaf, except when both leaves are submerged there is little, if any, resistance to leakage through the crevices at the sides of the lower leaf. Consequently, other things being the same, the leakage along the side edges of the lower leaf must naturally and inevitably be considerably in excess of any leakage which may come into the chamber beneath the leaves through the apertures at the side edges of the upper leaf. In consequence of this it is evident that there must be a constant and regular inflow of water to a greater or less degree from the flume into the chamber beneath the gates when it is desired to maintain the latter in an elevated position. Hence my views are at total variance with those of Roberts on this question as he finally explains.

99 Under the conditions stated in the interrogatory, the dam would necessarily fall at the expiration of a greater or less time, and this result would be due to the fact that the leakage being greater from the lower leaf than that admitted into the leaf chamber along the edges of the upper leaf and side walls of the dam, the water would soon be drained from out of the leaf chamber and from the flume.

Q. 8. State whether or not you have caused any experiments to be made to test the truth of said Roberts' opinion, and your own with regard to the effect of leakage around the leaves of said dam No. 8, and if so, what did you discover to be the actual results or effects of said leakage upon said dam No. 8?

A. Knowing that the leakage would inevitably be greater at the crevices between the sides of the lower leaf and the side walls of the dam than would be had at the sides of the upper leaf, I visited Du Bois and went to dam No. 8. At my direction, dam No. 8 was raised to its full height. The upper wicket of the flume was then closed to shut off the supply of water, the lower wicket was closed to retain the full height of water in the flume if possible. The leakage was so much greater at the lower leaf than at the upper, that the height of the column of water in the gate chamber and in the flume diminished rapidly, going down several inches in a few moments. The gates gradually lowered, proving conclusively that no excess of pressure could be caused in that dam through leakage around the sides of the upper leaf; also proving on the contrary such leakage was not sufficient to maintain the dam at its full height or to cause any reverse current from out of the gate chamber into the flume.

Q. 9. State whether or not the leaves of dam No. 8 continued to

sink when they were removed below the cleats or stops on the side walls of the dam chute?

A. They sank below the cleats and kept on sinking continuously as long as the experiment lasted.

Q. 10. State whether or not the upper end wall of said dam No. 8 is higher or lower than the lower end wall. I mean the
100 upper end wall of the fore bay or flume and the lower end wall of the fore bay or flume?

A. The upper end wall is the highest. The lower end wall is about 15 or 18 inches lower than the comb of the dam when raised.

Q. 11. State whether or not you noticed any difference between the size of the wicket in the upper end wall of the flume or fore bay and the wicket in the lower end wall of the flume or fore bay in said dam No. 8?

A. I noticed no difference.

Q. 12. Witness shown "Exhibit Kirk Sketch A," and is asked whether the figures 3 and 4 in said sketch correctly represent said wickets in the upper and lower end walls of the flume or fore bay in dam No. 8 as being of the same size?

A. So far as I can ascertain without measurement the representation appears to be correct.

Cross-examination waived.

FRANK M. REESE.

Adjourned to March 19th, 1887, at 11 o'clock a. m.

PITTSBURGH, *March* 19, 1887.

Met pursuant to adjournment.
Present: Counsel as before.

JOHN E. DU BOIS, being duly sworn, deposes and says as follows, in answer to interrogatories propounded to him by T. H. BAIRD PATTERSON, Esq., counsel for defendant.

Q. 1. State your name, are, residence and occupation?

A. John E. Du Bois; age, 26 years; residence, Du Bois, Pennsylvania; occupation, manufacturer of lumber.

Q. 2. State from whom you acquired the properties at or near Du Bois, in the county of Clearfield, Pennsylvania, whereon dam No. 8, "Exhibit Kirk Map," is situated, and how?

101 A. It was acquired from my uncle, John Du Bois, by deed and will.

Q. 3. State whether or not your uncle, John Du Bois, is now dead, and if so, the date of his death.

A. He is dead. He died May 5th, 1886.

Q. 4. State whether or not you acquired title to all his letters patent and invention in the same manner as you did of the property and dam mentioned in interrogatory 2.

A. Yes, sir, I did.

Q. 5. State whether or not you acquired title as indicated in your last answer, to these letters patent now shown to you, to wit: No. 36342, dated September 2, 1862, and all other letters patent

taken out by your deceased uncle, John Du Bois, subsequent to said letters patent, No. 36342, up to the time of his death.

A. I did.

Q. 5. State whether or not as far back as you can remember your uncle's properties at Du Bois, he was experimenting with bear-trap dams and improvements thereof.

A. Yes, sir.

Q. 7. State whether or not since your acquisition of your uncle's said property, you have put on any of the dams any improvement or device for the relieving or preventing of excess of pressure of water under the leaves of the dam, which were not already in use at the time you acquired said property from your said deceased uncle.

A. I have made no changes in the dams since I acquired title from him.

Q. 8. Letters formerly filed at No. 15, May term, 1886, Arthur Kirk *vs.* John Du Bois, marked "Exhibits E 1 to E 10," and "Exhibits D 1 to D 11," and "Exhibit F," now first offered, shown to witness, and he is asked to state whether or not he found all these letters and telegrams among the papers of his late uncle, John Du Bois.

A. They were found among my uncle's papers as letters received from Mr. Kirk. I believe them to be Arthur Kirk's letters
102 and telegrams.

(Said letters are offered in evidence as "Exhibits E 1 to E 10" and "Exhibits D 1 to D 11," and "Exhibit F.")

(Said offer is objected to as irrelevant and incompetent.)

Q. 9. State whether or not, outside of these letters, you have any knowledge as to confidential or business relations existing between Arthur Kirk, the complainant, and your deceased uncle, John Du Bois?

A. I have none.

Q. 10. State whether or not you have ever used on dam No. 8, "Exhibit Kirk Map," or elsewhere, any device or construction for the purpose of regulating or preventing the excess of pressure of water under the leaves of said improved bear-trap dam, other than those covered and described in letters patent, No. 251,771, and the other patents granted to your deceased uncle, John Du Bois, and acquired by you as you have heretofore stated?

A. I have not used any other.

Cross-examination by Mr. BAKEWELL:

X Q. 11. Are you the defendant in this case?

A. I am.

X Q. 12. Did you acquire title to the dams which you own at Du Bois, by the deed or will of your deceased uncle?

A. We claim under the deed.

X Q. 13. Have you built any new dams since you acquired title to the dam property?

A. I have.

X Q. 14. Indicate on the map what dams you have built since you acquired title?

A. Nos. 5 and 7.

X Q. 15. Was there not an interference in the Patent Office between an application of your deceased uncle for a patent for
103 the construction of dams shown in patent 251,771, and an application of Arthur Kirk's, on which the patent here in suit was issued?

A. There was.

X Q. 16. Do the letters which you have put in evidence in your direct examination comprise all the letters which were written by Arthur Kirk to your deceased uncle, during the period beginning with the first letter and ending with the last?

A. I think not. As Mr. Kirk was in the powder business there were a great many other letters relating to that business, and were not put in evidence as they did not apply to this case.

X Q. 17. Are there any letters other than those put in evidence written during this period by Arthur Kirk to your uncle relating directly or indirectly to dams?

A. Not to my knowledge.

X Q. 18. Did you personally search for and find and select the letters which have been put in evidence?

A. I found only a portion of them.

X Q. 19. Who selected those which have been put in evidence?

A. I think the counsel. I do not know positively who selected them.

X Q. 20. Have you yourself read all the correspondence between Arthur Kirk and John Du Bois during this period?

A. No, sir.

X Q. 21. What device for regulating pressure under the dam leaves have you used other than the device shown in patent 251,771?

A. I have before stated that I used no other.

X Q. 22. Have you yourself read all the letters from Arthur Kirk to John Du Bois during this period?

A. I have not.

(Defendant's counsel objects to cross-interrogatories 13 and 14 as not proper cross-examination, incompetent and irrelevant.)

104 (Foregoing objection is put in now by agreement of counsel.)

Redirect examination:

Q. 23. State whether or not dams Nos. 5 and 7 have a washout or sand flume attached thereto, and also whether or not such washout or sand flume has any other function other than washing out the sand or mud from under the leaves of the dam?

A. Dams Nos. 5 and 7 have a sand flume attached and are used for no other purpose than washing out the sand and mud from under the leaves of the dam.

Q. 24. State how said washouts or sand flumes are constructed and operated?

A. The sand flume has an opening connected with the space under the leaves of the gate at the bottom of the sand flume, and has a gate at the bottom of the end wall of the sand flume opening into the pool below the dam, and when desired to wash out the mud or sand the gate is opened and the water is allowed to pass through it from under the leaves.

Q. 25. State whether or not the operation and use of the sand flume is temporary and at intervals, and only when required for the purpose of cleaning out the mud or sand from under the leaves?

A. Its use is temporary and is only used when necessary to wash the sand or mud from under the leaves.

Q. 26. State where, that is at what points, the flow of the water into the pool or stream below said dam, is regulated and controlled for the purpose of preventing undue pressure under the leaves of said dam?

A. It is regulated by the height of the lower end wall of the fore bay.

Q. 27. State whether or not said regulation of the water to prevent undue pressure is solely controlled in said dams Nos. 5 and 7 by the adjustment of the height of the lower end wall of the fore bay?

105 A. It is, and by that only.

Q. 28. Certified copies of the will and deed shown to witness, and he is asked to state whether they are the certified copies of the deed and will of his deceased uncle, John Du Bois, to him mentioned in his former testimony.

A. They are.

(Certified copies of said deed and will offered in evidence and marked "Du Bois Exhibit Deed" and "Exhibit Will.")

(Said offer is objected to as being irrelevant.)

JOHN E. DU BOIS.

FRANK M. REESE recalled.

Adjourned to March 24th, 1887, at 10 o'clock a. m.

PITTSBURGH, *March 24th*, 1887.

Met pursuant to adjournment.

Present: Counsel as before.

Examination of FRANK M. REESE:

Q. 13. (Kirk patent No. 268,411 shown to witness.) Look at the language of this patent, lines 39 to 43, of page 1, "of an open sluice, water-way or tail race so arranged relatively to the dam that the water which is not required to support the leaves will escape, and so relieve the dam of all unnecessary pressure," and also at the language contained in lines 109 to 121, as follows: "In the end wall of the dam I make an open sluice, water-way or tail race, (38) figure 2, at such height as will permit all water which is not required

to sustain the gates to escape from under them. When the gates are down, as in the position shown in figure 1, the water is admitted by the wickets under them. This raises and floats them up until they reach the position shown in figure 2. By that time, the
106 water having reached the sluice (38) which passes through the wall around the end of the gate, will flow freely through, sustaining the gates at that level." State whether or not you find any such open sluice, water-way or tail race as described in said language, or any equivalent thereof in any way whatever, in the construction of dam No. 8, on "Exhibit Kirk Map."

A. I do not. As I understand Kirk's invention, its object and the function of the open sluice, water-way or tail race, the characteristic feature of his invention is an open sluice, tail way or water-race extending from the chamber beneath the leaves down to the pool below, and adapted to carry off superfluous water admitted previously into this chamber beneath the leaves when it reaches a certain height. Dam No. 8 is not provided with the coustruction of sluice referred to and being used for such purpose, nor has it any open sluice of any kind whatever for carrying off from the chamber below the gates any superfluous water at any elevation. The construction and principle of operation and the function of dam No. 8, so far as the means for regulating the pressure upon the wings of the dam are concerned, is different. Surplus water is not admitted into the chamber beneath the wings. No provision is made for the admission of water, except to the extent necessary to raise the comb of the dam to any desired or given height. The regulation is done in advance of the dam—that is, the height of water under the gates is regulated by a regulating device which only permits sufficient water to enter the chamber, to raise the leaves to and maintain them at the desired height. There is no analogy so far as I can see between an apparatus or a mode for only admitting the requisite amount of water into the gate chamber, and one which admits more than the requisite amount, and then carries off the excess, espiecally in view of the fact that it is only the latter feature which is the new thing that characterizes the latter mode referred to. I do not find any mechanical equivalent because the Du Bois structure does not operate in substantially the same way to produce the same result. In fact, it operates in a substan-
107 tially different way. There is no analogy between the functions of the two constructions. In comparing mechanical structures it is not usual, and is not proper in my judgement, to compare them simply as mechanical structures abstractly, without keeping in view differences that exist or may exist in their functions or principles of operation. Mechanical structures, mechanism or parts of mechanism are frequently alike in appearance and in details of construction, without being equivalents of each other. This is because the functions or mode of operation will often vary when used under different conditions, or when the apparatus is used in a different manner. A lever may have a certain mechanical construction and operate in a particular way, but when disengaged or applied in a different manner, although

it may preserve the same or similar structure when used in a different manner, it may not be an equivalent for its use in the previous construction. There is no sluice of any kind, or tail race to carry the water off from under the leaves of the dam, hence not only is Kirk's construction which he used for that purpose, but no equivalent construction, and in fact no construction of any kind whatever possessing that function is used.

Q. 14. The same letters patent, No. 268,411, shown to witness, and he is asked to look at the language in lines 63 and 64, as follows: "Figure 4 is a view of one form of the relieving tail race," and also at the language used in lines 122 to 126 inclusive, on page 2, as follows: "A modified construction of *of* the sluice (38) is shown by figure 4, where the outlet (39) in wall is below the level of the water, the latter passing through the outlet (39) into a fore bay or well (40) and thence over the bridge (41)." State whether or not the well (40) referred to in the last quoted language of the patent can by any possibility under the limitations of the language used be properly termed a fore bay, and also state whether or not you find any such form of relieving tail race or outlet as a modified construction of sluice (38), as described in the language above quoted from said patent in the construction of dam No. 8, "Exhibit Kirk Map," or any equivalent of such relieving tail race,
108 outlet or open sluice in said dam.

A. As I understand it a modified construction of sluice (38) shown by figure 4 merely differs from the open sluice (38) in this, that instead of making the opening of the sluice (38) in the side wall of the dam at the height it is desired to carry off the surplus water, the opening is made down at the floor of the dam into a closed well on the outside of said side wall. This closed well is lower at one side or has a bridge (41) to permit the water to escape I presume, into the flume, to carry it down into the stream below. I would not consider the term fore bay as properly applied to this well. It is not a fore bay. If the well (40) were to be opened to the pool above, it would not be adapted to perform the functions and could not perform the functions of Kirk's apparatus. I find no equivalent apparatus for carrying off any superfluous water from under the leaves of the Du Bois dam. In fact no provision whatever to carry off any superfluous water of the dam chamber. As before stated, the principle of construction in the Du Bois dam is such that you don't get any superfluous water under the dam gates. Hence as I have frequently said before, there is not only no equivalent used, but no means whatever used for such purpose.

Q. 15. State whether or not under the language of the patent above quoted, the height at which the sluice (38) is fixed and the height of the bridge wall (41) are as described, are fixed at a certain height in the principle of construction, or are they adjustable?

A. The dam is not adjustable. The height to which the comb of the dam rises is fixed by the height of the opening for the escape of the water into the flume, as shown at (38), or by the height of the side wall of the well or bridge of the well shown by a modified construction (41) in figure 4. The dam can only raise to the fixed

height used in either of the two constructions. It has no means for adjustment.

Q. 16. State whether or not if the well (40) shown by figure 4 were changed from a closed well to a fore bay, it would be possible for the construction claimed by said patent as figure 4,
109 to continue to be an open sluice, water-way or tail race, so arranged relatively to the dam that the water not required to support the leaves will escape, and also the other reasons for your views?

A. By the change suggested I presume you mean that the well (40) shall be made open to the pool above, and that the water required to elevate the leaves of the dam and support them when elevated, shall enter the gate chamber from this fore bay. With this understanding I answer: If such a construction is used it is obvious that it cannot accomplish the object of Kirk's device. It is radically different, both in principle and mode of operation. The well or fore bay then becomes an apparatus for regulating the height of the column of water in advance of the dam as in Du Bois' case. No superfluous water would enter the gate chamber. The sluice would not and could not be a relieving sluice to carry away from beneath the gates an excess of water because no excess would pass into them. Your question calls for a construction which is totally unlike in its functions, the function of the well referred to. The Kirk device contemplates and must contemplate the use of an opening to admit water into the gate chamber, in addition to a sluice or opening to carry away from the gate chamber an excess of water admitted by the first opening. Otherwise the device is impracticable and cannot possibly work, unless we are driven to the absurdity of supposing that the leakage through the front gate is in excess of that which takes place through the lower gate or leaf.

Q. 17. Your attention is called to the last sentence of the language of the patent quoted in interrogatory 13. State whether or not under those conditions described in the language of the patent, it is ever possible for the inlet opening into the dam chamber under the claims of said patent to be the outlet?

A. It is not possible.

Q. 18. If the well (40) were a fore bay, what would intervene
110 between the opening (39) and the bridge (41), and would such intervening obstacle preclude the opening (39) from remaining an outlet, and would it prevent the construction (39), (40) and (41) from being an open sluice, water-way or tail race such as is described and claimed in said Kirk patent, and if so, state why; and if not, state why, and give your views and reasons?

A. If the well were removed and a fore bay inserted in place thereof, it could not possibly be an open flume or tail race to carry off superfluous water from under the leaves. If such construction resembled that of dam No. 8, because there would be a radical and total departure from the construction and functions of the relieving apparatus described, shown and claimed in the Kirk patent. You would then have the Bu Bois dam instead of the Kirk. If, how-

ever, your question applies to a dam which shall have some means for admitting superfluous water into the gate chamber, it is possible that the fore bay might act to carry off superfluous water from under the gates, but as I have stated before, in such case, the functions of this construction would not be the same as the Du Bois. It would be entirely useless to apply the fore bay because the water would then not be regulated in advance or previous to its admission under this gate chamber as is the case in the Bu Bois construction, but you would have Kirk's construction. Admitting a surplus of water under the gates from the pool above, and then carrying it off from under the gates down into the pool below. This would be Kirk's construction or the equivalent of it. It would embody the principle of operation embodied in his apparatus. It would not be the Du Bois construction and would not and could not embody his principle of operation, that of regulating the height of the column of water previous to its admission into the gate chamber.

Q. 19. State whether or not the lower end wall of the fore bay or flume in the Du Bois dam No. 8, "Exhibit Kirk Map," is fixed in height like the bridge (41) in Kirk's patent, figure 4, or whether it is adjustable?

A. It is provided with detachable end boards, so that the
111 height of the lower wall can be regulated at any time by removing and replacing these end boards to increase or diminish the height of the end wall to give any elevation desired to the comb of the dam, and differs in this respect from the Kirk dam which can only be adjusted at a given height.

Q. 20. (Witness shown Kirk patent 268,411.) Examine the sixth claim of this patent, as set forth in the language thereof, lines 98 to 102, page 3, as follows: "6. A bear-trap dam having a relieving or open sluice extending from under the gates, so as to relieve them from unnecessary pressure, substantially as and for the purposes described." State what device is described in said claim and what are the limitations fixed thereby upon the construction and functions of such device.

A. As I understand Mr. Kirk's invention, he claims broadly a bear-trap dam having a relieving or open sluice extending out from under the gates, so as to relieve them of unnecessary pressure by carrying away from under them, into the pool below, the excess of water which comes under the gates, and otherwise would produce an excess of pressure. The invention which is disclosed in the patent is a relieving sluice of this description. The Kirk device, like all previous bear-trap type of dams, is liable to admit an excess of water into the dam chamber. The function of the sluice is simply and only to carry away the excess of water which is admitted into the gate chamber. The effect produced by the Kirk improvement is to maintain the water in the gate chamber at a lower level than that of the pool above. The claim in my opinion is a broad one. It is not restricted to any particular construction of bear-trap dams, but it is a claim for an open sluice extending from under the gates to relieve them of unnecessary pressure substantially as described. It covers, therefore, not only the particular

devices set forth in the Kirk patent for carrying away from under the gates superfluous water down into the pool below, but also known or equivalent devices for conducting an excess of water, introduced under the gates, out from under them and down into the pool below. That is, it must be an open sluice at a fixed
112 height or adapted to convey water when the latter has reached the fixed height, out from under the gates down into the pool below.

(Question and answer objected to as usurping the office of the court in construing and defining the scope of Mr. Kirk's claim.)

Q. 21. State whether or not you find any such open sluice, water-way or tail race as claimed in the Kirk patent, especially taking into consideration the language limiting the construction thereof, as set forth in lines 132 of page 2, to line 3, of page 3, of said patent, which is as follows: "But in all cases an open channel will be necessary when the water has reached a certain height or pressure under the gates," as existing in the construction of dam No. 8, "Exhibit Kirk Map," or any equivalent of such open sluice, water-way, tail race or channel.

A. I do not find any such construction, any equivalent construction, or any construction whatever of tail race or flume for carrying off from under the leaves of the dam an excess of water down into the pool below. The mechanical construction of dam No. 8 is not only different, but the object of that construction is totally different. It is not an equivalent for doing what Kirk's flume or open tail race does. Further it does not operate in the same way to produce the same effect. The construction of dam No. 8 has for its object the production of something not contemplated, not hinted at, or indicated in any way whatever in the Kirk patent, *i. e.*, regulating the amount or quantity of water which is caused to flow into the dam chamber previous to its admission into that chamber. In other words the object of the construction and its functions are to totally prevent the evil which Kirk's construction does not prevent but merely seeks to obviate, *i. e.*, the evil is occasioned by too much water in the dam chamber. Du Bois prevents this trouble from occurring by only admitting the requisite amount of water into the dam chamber. Kirk like his predecessors, admits more than the requisite quantity, and then runs it off or carries away the
113 surplus into the pool below. Du Bois' apparatus is not an *an* equivalent in my opinion because it not only does not do what Kirk's apparatus does by the same, or substantially the same mode of operation, but in fact it does not do by any mode of operation that which is done by Kirk's construction. The functions of the two apparatus being therefore totally different, one cannot be an equivalent of the other.

Q. 22. State whether or not you have examined interrogatory 11, asked to T. P. Roberts, witness on behalf of the complainant Kirk, and also his answer thereto, and if so, state whether or not the reasons therein set forth in any way affect your answers to the last two interrogatories?

A. I find nothing in Mr. Roberts' answer to interrogatory 11 referred to, which can affect the opinion I have given in my previous answers. Mr. Roberts states that "the fact that there is a difference in the level between the water in the gates and the pool above indicates this without anything further." By this Mr. Roberts refers to a regulating sluice such as described in the sixth claim of the Kirk patent being used on the dam referred to. Mr. Roberts apparently labors under the delusion that because the result produced by the Kirk mechanism is to produce a difference in the level between the water in the gates and the pool above, any device which accomplishes the same result would be the same as that described and claimed in the Kirk patent. He apparently has construed Kirk's sixth claim to cover this result of producing a lower level of water in the gate chamber than the pool above, irrespective of his particular mechanism, or of any kind of mechanism, or of his particular mode of accomplishing the result. He states that the fact that there is a difference in the level without anything further is sufficient to show that the Du Bois dam is an infringement of the sixth claim. If this is so, if the claim can be construed so broadly as to include every means of producing this result, in my opinion it is necessarily void. I do not believe that the claim is designed to cover a result, therefore I can find nothing in
114 Mr. Roberts' answer which can affect any change in the opinions I have given in the two last answers.

(Answer objected to as incompetent. The answer is not evidence but is merely argumentative.)

Recess until 2 p. m.

Q. 23. State whether you have examined questions to and answers of T. P. Roberts, at interrogatories 12, 13, 16, 17, 18, 20, 22 and 24, and state whether you concur in the answers and views therein expressed?

(Question objected to so far as relates to Roberts' interrogatories 20, 22 and 24, because witness has already answered this question in his prior deposition.)

A. Mr. Roberts' answer to interrogatory 12 is incorrect. There is no outlet of a greater discharging capacity than the inflow of the Du Bois dam. There is only one opening into the gate chamber. This opening is always an inlet opening, while the gates are being raised and maintained in position. There is no outlet opening to carry off any excess of water. The difference in the level between the water in the gate and the pool above is not due to any outlet opening whatever to carry superfluous water from under the gates. It is due simply to the fact that only sufficient water is admitted into the gate chamber to fill the latter up to a point below the level of the pool above. His answer to interrogatory 13 is incorrect in stating that there is any relieving sluice which would operate as if a pipe were introduced into the gate chamber. The pipe, if introduced, would act as a relieving sluice to carry away from the gate

chamber into the pool below an excess of water previously admitted into the gate chamber. The sluice of the Du Bois dam has no such function. Its function is not to carry away any excess of water after the latter has entered the gate chamber, but is totally different, the function of the sluice being simply to prevent any excess from entering into the gate chamber, which is a totally different function in my opinion.

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Mr. Roberts' answer to interrogatory 14 is incorrect in stating that plan No. 1 indicates a section of a sluice in the bear trap through which the water can flow from the fore bay into or out of the bear-trap gate, and then fall over a bridge or wall several or more inches lower than the comb of the dam. The water cannot possibly flow out from the fore bay into the bear-trap gate and then over the bridge. The direction of the current when the leaves are up and maintained in position, is always inward from the flume into the gate chamber, to make up the loss occasioned by the excessive leakage through the crevices of the lower leaf as compared with the leakage into the gate chamber at the crevices of the upper leaf.

Mr. Roberts' answer to interrogatory 16 is incorrect in my opinion, first in stating the two sets of drawings are precisely the same or identical. They are not so. It is evident upon comparison that the drawings illustrate two different mechanical structures which operate in different ways. The Kirk structure admitting an excess of water into the gate chamber and then carrying away the excess, whereas in the construction shown in "Exhibit Kirk Sketch A," representing the Du Bois dam, the water is regulated previous to its admission into the gate chamber. The flume in the Du Bois dam is not an open tail race or escape flume for carrying off any escapage or surplus water whatever from the dam. It is merely a flume for regulating the amount of water which is allowed to enter the gate chamber and the water which passes from the discharge or delivery end is not escapage water from the dam chamber, but only that portion of the water which is admitted into the flume which is not admitted to the gate chamber. It is escapage, not from the gate chamber, but from the pool above.

The answer to interrogatory 17 is incorrect in stating that the drawings are simply reversed; that in the one the fore bay is on the right, while in the other it is on the left. The fore bay (J) in figure 2 of "Exhibit Sketch A," does not correspond with the part marked (40). It is totally different. The part marked (40) is simply a well with a bridge wall or overflow at one side and communicates by an opening (39) with the gate chamber, if the other portions of the structure are to be left in the condition they are in in the dam which "Kirk Sketch A" indicates. If the fore bay is removed and this well (40) substituted in lieu thereof, the dam cannot rise at all and is inoperative. My reason for this is, the function of the fore bay, or one of its functions, is to supply the dam with the requisite amount of water to raise the leaves to and maintain them at a given height, as the leakage through the lower leaf is in excess of that of the upper a constant supply of

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water must pass from the fore bay into the gate chamber to*o* supply the deficiency. Otherwise the gates of the dam would fall on account of the leakage through the lower leaf. The so-called fore bay (40) is a portion of the device for carrying water away from the wings or dam chamber, when it has reached a given height. It is evident from reading the description of Kirk's invention that his function is to carry away from the gate chamber an excess of water which is admitted thereto. It is therefore not open to the pool above as is the case with the Du Bois flume. It is a different mechanical structure operating in a different way, and does not have the function of the Du Bois flume. The fore bay (J) as used in the Du Bois dam is not the same, nor is it an equivalent of the so-called fore bay in the part marked 40, in figure 4 of the patent.

Mr. Roberts' answer to interrogatory 18 is incorrect in stating that in No. 1 the part marked "M" corresponds to the part "39" of the patent. The part "39" in the patent has for its function forming an outlet for the escape of superfluous water or an excess of water from under the leaves. The open water-way, or part marked "M," has no function for carrying superfluous water out from under the gate leaves. Its function is merely that of an inlet to supply the necessary quantity of water to the chamber under the gates to raise them to and maintain them at the proper height. It
117 is not an outlet except when the gates are to be lowered. It has no function whatever in regulating the pressure under the dam by removing water therefrom.

The answer to interrogatory 20 appears to be correct with the exception that I don't find any arrangement for relieving undue pressure. Instead of that Du Bois uses an arrangement for preventing that.

The answer to interrogatory 22 is correct, as there will always be an inflow from the flume into the gate chamber as long as the Du Bois dam is elevated.

The answer to interrogatory 24 is incorrect. Mr. Roberts has forgotten to consider the fact that the leakage through the lower gate would be in excess of the leakage through the upper gate. Consequently, the flow would not be onwards through what he calls the relieving sluice into the fore bay, and so over the wall. On the contrary in the Du Bois dam the flow would always be from the flume through the opening into the gate chamber to supply the deficiency occasioned by the greater leakage of the lower leaf.

Q. 24. State what, if any, practical disadvantages you find incidental to the use of the modified construction claimed by Kirk's patent, 268,411, under the form of construction, figure 4?

A. The construction shown in figure 4 has the following defect. It is a well-known fact that the amount of impurities which can be held in suspension mechanically by a column or body of water varies with the velocity of the current. As the water enters the gate chamber at a considerable velocity, it remains, comparatively speaking, in a state of rest in the gate chamber, a large portion of the impurities will settle and collect on the floor of the dam. As the cross-

sectional area of the well (40) would be comparatively large in view of the volume of water which passes over the bridge wall (41), the water in this well would have a sluggish motion. Consequently mud and mechanical impurities, or impurities held in mechanical suspension would be deposited in the bottom of the well (40). The accretions at the bottom would be liable to choke up the
118 opening (39). Such results would put the dam under the same influences as though no relieving sluice was employed, and the leaves would be liable to the excess of pressure which is apt to come upon the leaves of ordinary bear-trap dams. The pressure would be apt to raise the leaves beyond the safety limit and throw the lower leaf down-stream.

Q. 25. State what would be the result, supposing the opening of the gate chamber from the fore bay of the Du Bois dam were to become choked?

A. It would simply cut off the supply of water to the gate chamber, and as the leakage of the lower leaf is in excess of that of the upper, the dam would gradually lower without damage. In such case the sinking of the leaves would occur slowly and give notice to any person around the dam of the condition of the inlet; whereas in the case of both the Kirk constructions if the outlets should become choked in this manner, an excess of pressure would immediately come on the gates of the dam and likely injure them or throw the lower leaf down-stream.

Q. 26. What are the comparative merits of the Kirk outlets or tail races, as compared with the Du Bois flume or fore bay with its adjustable lower end wall, in regard to the prevention of excessive pressure under the leaves or gates of the dam in time of high water?

A. The Du Bois structure is designed to prevent any more water entering the gate chamber than is sufficient to raise the gates to and maintain them at any given height. If this design is carried out there cannot be at any time any excess of pressure upon the gates. The Kirk dam receives water from the pool above and has an outlet or safety flume of a given size. It is a well-known fact that the capacity of the flume will vary according to the pressure or the height of the column of water in advance of it. If the outlet flume is of the same capacity as the inlet flume at a moderate stage of water in the pool above, it will not be able to carry off the superfluous water which enters the gate chamber, until there is an
119 increase of pressure above the normal pressure therein. This, however, migh be remedied by making the outlet of much larger size than the inlet. In cases of sudden rise, or where the water was very high in the pool above, there might be some excess of pressure above that required to keep the gates in position, in the case of the Kirk dam. The great practical advantage of the Du Bois construction over Kirk, in my opinion, is that all relieving sluices are apt, or at least liable, from various causes to become choked to *to* a greater or less degree. Hence there might be a degree of pressure higher than that contemplated in the use of the

Kirk dam. The choking of the opening into the chamber of the Du Bois dam would act directly opposite and cause the pressure to lessen instead of growing greater.

Q. 27. State whether or not you find anywhere in the Kirk patent any claim for the construction of a fore bay or flume with a wicket gate at the upper end thereof for regulating or controlling the amount of water allowed to flow therein from the upper pool, and also having a wicket gate in the lower end thereof regulating and controlling the amount of water allowed to escape therefrom equivalent to the flume or fore bay (J) in "Kirk sketch A," figures 2, 3 and 4?

A. I find nothing of the kind in the Kirk patent. It is not indicated in the remotest degree by the Kirk drawing. There is no description or indication of such a construction in the specification. I fail to find the slightest trace of the construction called for. There is no claim so far as I can see for any such construction.

Q. 28. State whether or not the dam constructed according to the devices claimed in Kirk's patent would be subjected to the entire strain or stress of the water from the upper pool without any prior regulation, as contemplated or provided for in the Du Bois dam No. 8, "Kirk map?"

A. The full head of water is admitted into the gate chamber but does not come upon the gates entirely because a portion is carried off by the relieving sluice.

Q. 29. State whether or not if the relieving sluice should
120 become choked, or if it should not be of sufficient capacity to relieve the excess pressure resulting from high stages of water in the upper pool, the Kirk devices would be practically useless?

A. If the relieving sluice became choked it would not perform its function and therefore would be useless.

Q. 30. State whether or not the Kirk patent dam constructed under the claims of his patent, has any device by which it can be lowered below the height fixed at which flume "38" or bridge "41" will discharge.

(Objected to as incompetent and irrelevant.)

A. It is stated that there are wickets for discharging the water to and from the dam. I suppose therefore that the dam necessarily is to be provided with means for raising and lowering it. These wickets are arranged to be under the control of one person. The eighth claim is for a combination of devices for enabling the wickets to be operated by one person to admit and discharge water under the dam.

Cross-examination:

X Q. 31. Referring to Defendant's "Exhibit Model," suppose that instead of having the lower end wall of the fore bay lower than the position of the comb of the dam when up, I should board it up to make it the same height as the upper end wall of the fore bay and should then cut down the outer side wall of the fore bay to the same

level as the original level of the *of the* lower end wall, would the dam then act to relieve the water in the fore bay in advance of the dam leaves in the same way as you say the Du Bois dam operates?

A. It could make no difference whatever in the operation of the Du Bois dam whether you allow the water to flow out of the side of the fore bay or over the end wall at any given height. The change in construction would not alter the fact that the function of
121 the fore bay would still be that of regulating the quantity of water admitted into the dam chamber.

X Q. 32. Question repeated?

A. It would make no difference.

X Q. 33. Supposing the opening (38) to be large enough, does it not act to prevent the water in the dam chamber from rising above its level?

A. Yes.

X Q. 34. Supposing the opening at the top of the lower end wall of the fore bay in Du Bois' dam No. 8 to be large enough by which word opening I mean the width between the two side walls of the fore bay, would not the water be prevented from rising in the dam chamber higher than the level of the lower end wall of the fore bay?

A. Certainly, the result would be the same as in the previous instance.

X Q. 35. State what experience you have had in the construction and operation of dams?

A. I never had any. Have frequently seen dams examined; the plans and specifications of dams. I never had anything to do with the construction or operation of them. I am not a hydraulic engineer like Mr. Roberts.

X Q. 36. Suppose a dam constructed as you imagine the dam shown in figure 4, of the Kirk patent, to be constructed, would not the limit of rise of the dam leaves be regulable by building up the bridge (41) or cutting it down?

A. Certainly. You could tear off part of the bridge or add more to it to raise or lower the height of the dam.

X Q. 37. What is a fore bay?

A. As I understand the term, a fore bay is a flume attached to bear-trap dams, provided with a wall at its lower end and with side walls to convey water to or under the leaves of the dam from the pool above; also provided with a wicket or gate at its lower end to allow the escape of water from the lower end. I am not familiar with the term fore bay, and have only known it in connection with the Du Bois dams.

FRANK M. REESE.

122 Counsel for defendant offers in evidence the following exhibits:

Letters patent No. 36342, dated September 2, 1862, to John Du Bois, and the same are marked "Du Bois Exhibit A."

File-wrapper and contents of the application of John Du Bois, filed April 19th, 1881, dams and locks, and the same is marked "Du Bois Exhibit B."

Letters patent No. 229,682, dated July 6th, 1880, to John Du Bois, improve-nt in dams and locks, and the same is marked "Du Bois Exhibit C."

(The foregoing "Exhibit C" is objected to by counsel for complainant as incompetent and irrelevant.)

Letters patent No. 236,488, dated January 11, 1881, to John Du Bois, for locks and dams, and the same are marked "Du Bois Exhibit G."

(The foregoing "Exhibit G" is objected to by counsel for complainant as irrelevant and incompetent.)

A certified copy of the file-wrapper and contents, except preliminary statement in the matter of the interference between Arthur Kirk and John Du Bois for movable dams, and the same is marked "Du Bois Exhibit H."

The testimony on pages 6, 7, 8, 9 and 10, being the testimony taken from the witnesses James H. Harlow and David M. Kirk, on behalf of the complainant, Arthur Kirk, the testimony of complainant, Arthur Kirk himself, on pages 14, 15, 16, 17 and 18 of the printed copy of "interference testimony," filed by the complainant, Arthur Kirk, in his former case against John Du Bois, at No. 15, May term, 1886, filed January 11th, 1886, and now of record in this court, and the same is marked "Du Bois Exhibit I," offered
123 for the purpose of showing what the complainant, Arthur Kirk, claimed to be his patent at the time this testimony was taken, and that he in no way claimed any such device as that used by defendant, John E. Du Bois; said testimony also to be used in connection with letters of Arthur Kirk, offered in evidence in this case.

(Consideration of the foregoing exhibit is objected to unless it be considered as a whole, including the depositions of all the witnesses and the exhibits filed with said depositions. Counsel for complainant especially objects to the consideration of the testimony of Arthur Kirk, independently of the "Exhibit Kirk Caveat" referred to in said deposition.)

A certified copy of the file-wrapper and contents of the letters patent granted to John Du Bois on January 3, 1882, and numbered 251,771, and the same is marked "Du Bois Exhibit J."

Letters patent No. 251,771, granted to John Du Bois on January 3, 1882, and the same are marked "Du Bois Exhibit K."

(Offer of "Exhibits J and K" is objected to by counsel for complainant as irrelevant and incompetent.)

A certified copy of the drawings attached to the application of John Du Bois, filed April 19th, 1881, for improvement in locks and dams, and the same is marked "Du Bois Exhibit L."

UNITED STATES OF AMERICA, } *ss:*
Western District of Penna., }

I, Truman Ames, specially commissioned by the circuit court of the United States, for the western district of Pennsylvania, in the third judicial circuit, to take depositions under and by virtue of the act of Congress, do hereby certify that on the day hereinabove

stated, at Du Bois, county of Clearfield, State of Pennsylvania,
124 I was attended by C. C. Brenneman, Charles Loring, W. A. Butler, J. O. Lithgow, N. L. Hoover, James C. Beard, E. B. Nettleton, D. D. Moore, W. I. Horn, William Mix and George R. Vosburg, who were of sound mind and lawful age, and the said witnesses having been by me carefully examined, cautioned and sworn to testify to the truth, the whole truth, and nothing but the truth; the foregoing depositions were reduced to writing by me, in the presence of the witnesses who subscribed the same in my presence.

I further certify that the reason for taking said depositions, and the fact is that the said C. C. Brenneman, Charles Loring, W. A. Butler, J. O. Lithgow, N. L. Hoover, James C. Beard, E. B. Nettleton, D. D. Moore, W. I. Horn, William Mix and George R. Vosburg live at a greater distance than 100 miles from the place of trial of the cause for and in which said depositions were taken.

I further certify that I am not of counsel or attorney for either of the parties to the said cause, or in any manner interested in the event of the same.

In testimony whereof, witness my hand and seal this 28th day of June, A. D., 1887.

TRUMAN AMES,
Notary Public.

C. C. BRENNEMAN sworn.

Mr. Bakewell objects to the taking of the deposition of this witness and generally to the taking of any testimony on the part of defendant at this stage of the cause. The defendant has also closed his evidence and the present depositions are unauthorized and contrary to the rules of equity practice. Mr. Bakewell renews his notice that at the hearing of this cause he will move the court to strike from the record the deposition of this witness and other depositions now intended to be taken and to put the costs thereof upon the defendant.

T. H. B. Patterson, attorney of the defendant, offers the
125 witness called and proposes to examine him only for the purpose of contradicting new facts and matters improperly testified to by complainant's witnesses when called and improperly examined under a claim that their testimony was in rebuttal of the testimony offered by the defendant in proving his case in defence heretofore, when in reality the testimony of the witnesses examined by the complainant under a claim of being in rebuttal, was in reality only in contradiction and in supplemental proof of new matters which were entirely incompetent and irrelevant unless supplementary to and as part of the complainant's case-in-chief.

Mr. Bakewell denies the fact of any improper rebutting evidence having been taken on the part of complainant, and renews his objection and protest against this testimony.

(Witness shown "Exhibit Kirk Map, W. B. P., N. P., October 4th, 1886.")

Q. 1. Do you recollect the old bear-trap dam near the foot of the lane?

A. I do.

Q. 2. Was the dam you speak of the only one torn away near the foot of the lane that you know of?

(Objected to as incompetent and not in answer to complainant's rebutting testimony, and also for the reasons above given.)

A. No, sir; there was another torn away below but I do not know it to be a bear-trap dam.

Q. 3. Did you, within the last year or two, help tear out an old bear-trap dam near the foot of the lane on the Du Bois property in Sandy creek?

(Same objection as to the above.)

A. I did.

Q. 4. Who, if any person, helped to tear out the dam you
126 speak of, and about what time did you tear it out?

(Same objection as above.)

A. William Butler and O. P. Hartman helped me; last fall, along about September I think.

Q. 5. State, if you remember, what was the arrangement of the planks on the lower end wall of the fore bay in that old dam? Were they straight up and down or were they crosswise?

(Same objection as above.)

A. To the best of my recollection they run crosswise.

Q. 6. State whether or not the plank of the fore-bay walls appear to be a part of the old structure of the dam?

(Same objection as above, also for the further reason that the question is leading.)

A. They were old and decayed, the same as the rest of the planks in the dam.

Cross-examination:

X Q. 1. Whose employ are you in now?

A. In Mr. Du Bois'.

X Q. 2. How long?

A. Seven years since I commenced to work for Mr. Du Bois; that was for the old man.

X Q. 3. When did you come to Du Bois?

A. In 1880.

X Q. 4. Did Mr. Du Bois employ you to come here on his works?

A. No, sir.

X Q. 5. What was your occupation before coming to Du Bois?

127 A. General work in the oil country; driller, pumping and work on a pipe line and anything that I could get to do.

X Q. 6. What work have you been doing for Mr. Du Bois?

A. I worked first on the Big mill, in the planing mill, on the farm and on the creek, and piled lumber in the lumber yard.

X Q. 7. Had you worked about the creek or about the dams before you tore out the dam?

A. Yes, sir.

X Q. 8. What part did you take in tearing out the dam?

A. There were three of us put there to tear it out and we went to work and tore it out. First we tore the bridge off the top, a part of the bridge only so that we could get at the timbers to cut them off on the side next the wicket, we then tore out the guard wall on the inside next to the wicket gate, we then took out the wickets and then commenced to take up the bottom. The gate had washed out before. We went to work and sawed the timbers off at both sides of the guard wall and then took up the timbers; that completed our job.

X Q. 9. What was the condition of the timbers on both sides of the guard wall?

A. Pretty well decayed on the one side, the other side we did not take out at all.

X Q. 10. How long did the job take you?

A. It took us two or three days. I do not just remember the time.

X Q. 11. Was the dam strongly made?

A. I think the timbers were 8 x 8.

X Q. 12. Were the timbers nailed?

A. The planks were nailed onto the 8 x 8 timbers.

X Q. 13. What were the planks of the fore bay nailed to?

A. They were spiked to an upright 2 x 4, spiked to the guard wall.

X Q. 14. Were the planks of both ends of the fore bay fastened in the same way?

A. I do not remember how the upper one was fastened but think in the same way as the lower one.

128 X Q. 15. Do you think then that at both ends of the fore bay the planks were nailed to the upright?

A. I cannot say as to the upper one but the lower one was nailed to the upright.

X Q. 16. Was the condition of the whole dam about the same, the timber about equally rotten or sound?

A. The timber in the water under the gate was apparently sound, that above the water was rotten.

X Q. 17. Of the lower end of the fore bay how much was rotten and how much was sound?

A. The planks at the lower end of the fore bay were not rotten, but the 8 x 8 were rotten above the water.

X Q. 18. How far from the top were the 8 x 8 rotten?

A. Some of them were rotted down farther than others, some of them half way and some not so far and some perhaps farther.

X Q. 19. What is your work now?

A. I am working on the creek, floating logs down Sandy.

X Q. 20. Your work consists principally in spearing *to* logs and floating them down to the mill?

A. Yes, sir; in rolling them into the creek with a cant hook and running them to the mill.

The above cross-examination has been made by J. H. Bakewell subject to the objections and protests above noted.

C. C. BRENNEMAN.

CHARLES LORING sworn.

Age 53, occupation saw-filer, I reside in Du Bois, Pa.

Mr. Bakewell objects to the taking of the deposition of this witness for the same reason as before stated by him in objecting to the deposition of C. C. Brenneman.

Q. 1. State if you recollect the old bear-trap dam at or near the foot of the lane which has been torn away? If so when
129 was it built and when was it torn away?

(Objected to as incompetent, not in answer to complainant's rebutting testimony and for the reasons above referred to.)

A. I recollet the old bear-trap dam perfectly well, but when it was built I cannot tell, I think some time in 1878 or '9 but which year I cannot tell, have nothing to fix the date. I think it was torn away in 1886. I do not know who tore it away.

Q. 2. State whether or not the dam you refer to was the first improved bear-trap dam built on the Du Bois property and whether or not you took any part in the building of it?

(Same objection as above.)

A. Yes, sir, to both questions.

Q. 3. State how this dam was formerly designated or known, and if it was the dam visited by the chamber of commerce excursion in 1879?

(Same objection as above.)

A. It was known as Mr. Du Bois' patent dam, or the bear-trap dam. There was a party from Pittsburgh here but whether they were the chamber of commerce or not, I do not know. They came up in the latter part of November or of December, 1879, and they were the only large party that I know of visiting the dam.

Q. 4. State, if you recollect, how the plank were arranged on the lower end wall of the fore bay of that dam, whether they ran up and down or crosswise?

(Same objection as above.)

A. They ran crosswise.

Cross-examined by J. H. BAKEWELL, subject to the same
130 conditions and objections as were made to the testimony of the previous witness:

X Q. 1. What position do you hold now in the employ of Mr. Du Bois?

A. I am saw-filer.

X Q. 2. Did you hold the same position at the time this dam was constructed as you do now?

A. Yes, sir, in the sawing season.

X Q. 3. What position did you hold when the dam was built and what part did you take in the building of it?

A. I was working at wood-work at the time. That is what I work at in the winter.

X Q. 4. Was the dam completed when the party from Pittsburgh visited it?

A. I think it was. I had left it.

X Q. 5. Did you leave it before it was completed?

A. I might say that I did; there were probably some little alterations to be made, but I do not know what they were.

X Q. 6. Was this dam built the same year that the excursion from Pittsburgh visited it?

A. It was built the same year that they came here.

X Q. 7. You say that you do wood-work in the winter; what time do you usually begin and at what time did you begin that year?

A. I cannot tell at what time I commenced that year. I commence when the mill stops. Sometimes it occurs in September and sometimes later, and sometimes we run until it freezes up.

X Q. 8. Do you remember at what time that year the work on the dam began?

A. I cannot tell.

X Q. 9. Do you remember at what time you left off work at the dam?

A. I should think it was in November, but it might have — later.

131 X Q. 10. How long were you at work on the dam?

A. I should think from two to three weeks, it was not less than two weeks and it might have been four.

X Q. 11. How many leaves did the dam have?

(Objected to as not proper cross-examination and taking up unnecessary time.)

A. There were two gates, one on this side and one on the far side.

X Q. 12. Was there another leaf attached to the upper leaf and hanging down on the lower leaf?

(Same objection as above.)

A. There was.

X Q 13. How were the planks arranged on the upper end wall of the fore bay?

A. Planked up crosswise as it was at the lower end, I think.

X Q. 14. When did you first come to Du Bois?

A. In March, 1875.

X Q. 15. What kind of work did you do before you came to Du Bois and what kind of work did you do on the dam?

A. I filed saws in the summer and done carpenter-work or mill-

wright work in the winter, the same as I have done here. I did carpenter-work on the dam; putting in gates, planking up, &c.

X Q. 16. Was the fore bay completed when you left the dam?

A. It was supposed to be.

X Q. 17. When and by whom was your work at the dams recalled to your memory?

A. It was called to my memory last summer some time when I was called in to testify in this case. I guess Mr. Fuller was the man that told me that I was wanted in the case. I made affidavit in the case and was afterward called three times, but was not examined.

132 X Q. 18. When and by whom was the position of the planks at the end of the fore bay recalled to your memory?

A. I could not state when, but think some time last summer, and I think Mr. Fuller called my attention to it.

X Q. 19. What did Mr. Fuller say to you?

A. I could not say now. He merely asked me if I remembered how they were put in, that is about all that passed between us.

X Q. 20. Did Mr. Fuller tell you what he himself recollected about the dam?

A. I don't think he did, he was merely inquiring what I recollected.

X Q. 21. Have you had any further conversation with Mr. Fuller or any other person about the dam, and if so state the substance of it?

A. I don't know that there has been any other conversation about it, there were some questions asked me when I was here last winter to testify, they thought I did not remember enough to be worth while to take up the time as they were in a hurry to get away.

CHARLES LORING.

W. A. BUTLER sworn.

Mr. Bakewell objects to the taking of the deposition of this witness for the same reason as before stated by him in objecting to the deposition of C. C. Brenneman.

Q. 1. State your age, occupation and residence?

A. Age 27; common laborer; I reside in Du Bois.

Q. 2. State whether or not you in company of any one else tore away the old bear-trap dam on the Du Bois property near the foot of the lane, and if so when was the dam torn away and who helped you in tearing it away?

(Objected to as incompetent, not in answer to complainant's rebutting testimony and for the reasons above referred to.)

133 A. Charles Brenneman and I tore out the dam. I do not remember the time but it was last fall.

Q. 3. How long have you lived and worked at Du Bois?

A. Four years.

Q. 4. Do you know how old the dam was that you tore out and who directed you to tear it out?

(Same objection as above.)

A. I don't know how old it was and I don't know who ordered the tearing out of the dam either.

Q. 5. State, if you recollect, how the planks on the lower end wall of the fore bay were arranged? Straight up and down or crosswise?

(Same objection as above.)

A. The plank on the lower end of the fore bay were crosswise.

Q. 6. State, if you recollect, whether any of the plank on the upper part of the lower end wall of the fore bay were loose or moveable?

(Same objection as above, and as being leading.)

A. There was one plank that was moveable.

This answer objected to as incompetent as it is contradictory of the testimony of C. C. Brenneman the previous witness called by the defendant.

The testimony of this witness is objected to as not being relevant to any of the issues in the case, and for this reason and the reasons above noted by the complainant's attorney at the time of the taking of the above testimony. For this reason complainant's attorney declines to cross-examine this witness.

W. A. BUTLER.

134 J. O. LITHGOW affirmed.

Mr. Bakewell objects to the taking of the deposition of this witness for the same reason as before stated by him in objecting to the deposition of C. C. Brenneman.

Q. 1. What is your age, residence and occupation?

A. Age 31, residence Du Bois, occupation machinist.

Q. 2. State if you were ever in the employ of John Du Bois, deceased, or of John E. Du Bois and for what periods of time and in what capacity?

(Objected to as incompetent, not in answer to complainant's testimony and for the reasons above referred to.)

A. I was in the employ of John Du Bois from May, 1875 until the first of November, 1885; during that full period, with the exception of one year, from June, 1881 to June, 1882. Until August, 1875, I worked at carpenter work, some time in August the machine shop started and I was put in the machine shop to work in the pattern department. From that on until 1881, I worked in the pattern department, in the machine shop department and in the draughting department. That was up to the time that I left the employ of Mr. Du Bois; and in 1882 when I again entered Mr. Du Bois' employment, I was made assistant foreman of the entire iron works. From June, 1882 until about the first of November of the same year, I continued to act as assistant foreman. At that time Mr. E. F. Bugler, the foreman, resigned and Mr. Du Bois made me foreman of the iron works. I acted in that capacity until November, 1885. At that time I resigned to accept another situation and

have not been in his employ since that time, except in the spring of 1886, when I made a drawing of a dam for Mr. Du Bois and partly completed a model, which I did not get finished before his death.

Q, 3. State, if you please, from the time you first entered the machine shop and iron department, up until November 1st, 1882, when Edwin F. Bulger resigned as foreman and you were
135 appointed in his place, what was the position held by Edwin F. Bugler under Mr. John Du Bois and where was he employed most of his time?

(Same objection as above.)

A. From the time that I entered the machine shop in Mr. Du Bois' employ, until November 1st, 1882, E. F. Bugler acted as foreman for Mr. John Du Bois; of his machine shop, and spent most of his time at the machine shop.

Q. 4. State whether or not up to the time you took his place he had any such position as general mechanical engineer, superintending all mechanical constructions such as dams, buildings, &c., for Mr. John Du Bois, deceased, on the various parts of his property, and whether he had general supervision of such dams and other constructions, both as to the building and to the repairing and keeping in order of the same?

(Objected to for the reason above noted and as being leading and suggestive.)

A. He did not have full control of all constructions any further than as to the parts that were needed to be made at the shop, but what was ordered by Mr. Du Bois or the foreman that was in charge of that particular work, whatever it might be, at that particular time.

Q. 5. What if any dams on the Du Bois property did Mr. Edwin F. Bugler actually build or actually superintend at the dams themselves, during the time you were in the machine shop or in connection therewith?

(Same objection as made to question 2.)

A. I don't know of his superintending the construction of any dam at the stream, or of his building any.

Q. 6. If he had superintended the building of any of the dams, or had built any dams while you were in connection with
136 the machine shops and pattern department, were your relations such to Mr. Bugler's work that you would know of his so doing?

(Question objected to for the reason above noted and as being leading.)

A. I think that I would certainly have known if Mr. Bugler had been away from the shop long enough to have built a dam, for the reason that a great many of his duties in the way of finishing work that had been commenced, that I had made patterns for, was left for me to attend to in his absence.

Q. 7. What were Mr. Bugler's duties with regard to the making of plans, drafts and sketches for Mr. Du Bois?

(Same objection as to question 2.)

Q. 8. State whether or not did such sketches, plans or drafts control Mr. Du Bois in the actual carrying out of his own mechanical ideas, subsequent to the making of such plans, &c.

(Objected to for the reason above noted and for the further reason that it is leading and manifestly beyond the witness' competency.)

A. I do not think it did wholly from the fact that I have known Mr. Du Bois to change the plans right in the midst of the work without consulting Mr. Bugler or any one else. I have also known him to start out and complete a piece of mechanical work without any plans or drawings at all.

Q. 9. State who, prior to Mr. John Du Bois' death, took the general supervision or actually superintended all his mechanical constructions such as dams, buildings, &c., on different parts of his property outside of his machine shop and mills.

(Same objection as to question 2.)

A. John Du Bois was his own general superintendent.

137 Q. 10. State, if you please, how the work on each particular dam would be actually done in the building thereof, and who carried on the work at the dams themselves under the superintendence of John Du Bois deceased?

(Objected to for the reason above noted and for the further reason that it has not been shown how this witness is competent to testify as to the general management of Mr. John Du Bois' business.)

A. In the first place when Mr. Du Bois concluded to build a dam in a certain place, he would usually go to the machine shop and have a drawing made of it as he dictated it, he would then leave an order in the machine shop for the bolts, hinges, wicket gates, and all iron-work needed in the construction of the same. A copy of the drawing would be sent to the saw-mill to the man in charge of the framing machinery for him to use in the framing of the timbers to be used in the building of the dam, after that was done and the iron-work at the shop was finished, it was all taken to the place where the dam was to be built. Then Mr. Du Bois would take a man there in charge of a crew of men for the purpose of putting the dam together in the stream. Mr. Du Bois was usually at the place himself the greater part of the time during the time that the dam was being built.

Q. 11. State whether the putting of the dam together was done at the dam itself, and the putting on of the plank, &c.?

(Same objection as to question 10.)

A. Yes, all planking and the putting on of all timbers, cribbing, was done at the stream, or at the place where the dam was built.

Q. 12. State if while you were in the shop with Mr. Bugler, you made any of the drawings, plans and sketches ordered by Mr. Du Bois?

(Same objection as to question 2.)

138 A. From in June until the first of November, 1882, when I was assistant foreman, I did the greater part of the draughting, previous to that I occasionally did draughting for machinery which was being built for Mr. Du Bois, and I usually received my orders from Mr. Bugler to make the drawings. In most cases when he would give me the order for these drawings, his verbal order would be accompanied by a rude sketch which in most cases he would say that Mr. Du Bois wanted this particular piece of work for whatever it might happen to be for.

(The whole of the deposition of this witness is objected to as utterly irrelevant and trifling and for the reason that the competence of the witness to make the same has not been shown, and that he has answered questions for which it is manifest that he has no proper ground of knowledge. For these reasons and the reasons stated above, complainant's counsel declines to cross-examine.)

J. O. LITHGOW.

N. L. HOOVER sworn:

Mr. Bakewell objects to the taking of the deposition of this witness for the same reason as before stated by him in objecting to the deposition of C. C. Brenneman.

Q. 1. State your name, occupation and residence?

A. Name N. L. Hoover, age 42, occupation lumberman.

Q. 2. State what is your employment at the present time and how long have you been engaged in the same employment on the Du Bois property?

A. I am stocking logs for his mill and have been so employed for six years.

Q. 3. State whether or not during all this time you have had charge over dam No. 8 in Narrows creek at the railroad?

(Objected to as incompetent, not in answer to complainant's rebutting testimony and for the reasons above referred to.)

139 A. Yes, sir. From "Exhibit Kirk Map" I would understand dam No. 8 to be the dam in Narrows creek. According to that draft, dam No. 8 would be the dam at the railroad in Narrows creek.

Q. 4. State whether or not since the first of March this year, you have been driving any logs through that dam and how constantly you have been using it, and when you last saw it, and what is the condition of the lower end of the fore bay?

(Same objection as above.)

A. I have been driving logs this spring through that dam, about 8 million feet during March, April and May. I have not the scale

for them but that is as close as I can estimate it. The last time that I saw it was at 2 o'clock today, I also saw it last week. Was there for the purpose of seeing what repairs it needed this fall. The lower end of the fore bay is in good condition so far as I could see, the only leak that I could discover was around the frame around the wicket in one corner, probably as thick as a rye straw.

Q. 5. State, if you please, whether during your use of dam No. 8, from March 1 up to today, you have noticed any necessity for repairs to the lower end wall of the fore bay, or the lower bulkhead of the fore bay, or whether any repairs whatsoever have been made to said lower end of the fore bay, or to the lower bulkhead of the fore bay of the said dam during that period, I mean to the present time?

Same objection as above and as being leading and suggestive.

A. No further than taking roots out of the wickets.

Q. 6. Has the lower end wall of the fore bay of the said dam No. 8, or have the ends of the transverse plank on the land side of the lower head of the fore bay of said dam No. 8, seemed as though they had rotted away or were there any spaces therein through which the open hand could be passed at any time since the
140 1st of March up to today, and state particularly what the condition either way has been, that of the lower end wall or the lower end bulkhead of the fore bay of said dam No. 8 with regard to water-tightness, soundness or rotteness of wood therein up to the present time?

(Same objection as above and as leading and suggestive.)

A. The plank have not rotted away so as to make a leak or I would have discovered it, as to the soundness or unsoundness of the lumber, I have not cut into it to see whether it is sound or not, but it holds the water. No, I do not know of any spaces through which the hand could pass in the lower end wall of the fore bay.

Cross-examined by J. H. BAKEWELL, subject to the objections and protests already made to the depositions of previous witnesses, C. C. Brenneman and Charles Loring:

X Q. 1. Are you now in the employ of John E. Du Bois?

A. I am.

X Q. 2. How far is dam No. 8, to which reference has been made it you- direct examination, from the railroad station in Du Bois?

A. About three miles and a half.

X Q. 3. What direction from the station is the dam as regards the railroad?

A. It is toward Driftwood from Du Bois.

X Q. 4. Which dam is it counting from the station at Du Bois?

A. It is the third on the railroad.

X Q. 5. How far is the first dam from Du Bois and how far is the second?

(Objected to as not proper cross-examination for the reason that there has been no examination-in-chief with regard to the two dams cross-examined about and is therefore useless and causes unnecessary delay.)

141 A. The first one is about three-quarters of a mile from the station I think, and the second is two miles and possibly twenty rods.

X Q. 6. How far is dam No. 8 from the railroad track and on which side as you go toward Driftwood?

A. It is about 16 feet from the rail to the comb of the dam, I might be mistaken, I never looked at it in that way. It is on the left as you go toward Driftwood.

X Q. 7. You say that during all the time that you have been employed by Mr. Du Bois you have been stocking logs, what has been the nature of your employment and over what extent of creek have you performed your work?

A. My contract has been principally for cutting and peeling logs and delivering the logs in Sandy creek. There is three miles and a half of Narrows creek that I drive on now.

X Q. 8. How far is it from dam No. 8 to Sandy creek?

A. It is about a half a mile, I suppose.

X Q. 9. What is the exact nature of the work that you yourself perform?

A. I plan the work and look around to see what there is to be done and see that the men do it. My foreman directs the men.

X Q. 10. How many dams are there in the three and a half miles that you have specified?

A. There are two; one up Narrows creek about three and a half miles and another at the railroad.

(Witness shown "Exhibit Kirk Map" and asked to locate the dam up Narrows creek.)

A. The map does not show Narrows creek above the pond at the railroad.

X Q. 11. Does the part of the creek over which you work begin at the first dam and extend from the first dam down to Sandy creek?

A. I slide the logs into the first dam and float them down to the second dam and into Sandy creek.

142 X Q. 12. What is the age of each of these dams?

A. I could not give the exact year that these dams were built. I remember the time that the dam at the railroad was built, can't fix the year but suppose about five years, might be mistaken.

X Q. 13. Are both the dams of the same age?

A. I don't think they are, but don't know.

X Q. 14. When did you examine dam No. 8 in Narrows creek?

A. This afternoon and last Friday.

X Q. 15. For what purpose did you examine the dam on both occasions?

A. On last Friday I examined it to see what condition it was in

for a splash, and to see what repairs were necessary to put it in shape for next season. I had been asked if I had seen a leak in the end wall of the fore bay, and I had not, and to satisfy myself I went today and examined it, because if there was a leak there it was to my interest to know it. If there was a leak there we would loose the greater part of a splash. If a root or anything would get caught in the frame, the wicket would not close and that would cause a leak.

X Q. 16. When did you discover the leak that you say you found in the dam?

A. Today. It was about the size of a rye straw.

X Q. 17. When did you examine the dam before Friday last?

A. We had been using it through March and A-ril and two days in May. I had not examined it particularly since last fall. It had done its work. I did examine it once about a month ago as I passed there and found elder bushes and rubbish drifted into the lower wicket, I could not get them out without getting into the water and so sent other men to take them out and set the gate.

X Q. 18. What repairs did you find necessary to be made to dam No. 8?

143 A. There is a few pieces of sheeting to be put on above the gate on the wall, that is up in the pond, and an ice breaker on each post to keep the wear of the logs off the posts, and a rack to keep the drift from running down into the wicket at head of the fore bay.

X Q. 19. Please describe the examination you made on last Friday?

A. I operated the wicket to see that the gate would rise and fall with the water and examined the posts.

X Q. 20. Did you make any further examination than that you have already described?

A. I tried the gate to see if it would work and looked to see what repairs were necessary.

X Q. 21. What particular injury to the dam was you looking for?

A. I was looking for the wear and tear of the logs on the sides of the dam above the gates. The logs coming into the dam wear on the boards and posts on the sides and in time would wear off and I looked at it and concluded to flat a log and put on above to protect the posts.

X Q. 22. Was that the full extent of your examination on Friday?

A. Yes.

X Q. 23. When did you come into Mr. Du Bois' employ?

A. In 1881.

X Q. 24. Did you occupy the same position then as you do now?

A. Yes, I was log-ing by contract the same as I am now.

N. L. HOOVER.

JAMES C. BEARD affirmed.

(Mr. Bakewell objects to the taking of the deposition of this witness for the same reason as before stated by him in objecting to the deposition of C. C. Brenneman.)

Q. 1. State your name, age and occupation and also in
144 what capacity and for what period you were in the employ of John Du Bois, deceased?

A. Name, James C. Beard; age, 39 years; my present occupation is manufacturing in the saddlery line at Oswego, Tioga Co., N. Y. I was in the employ of John Du Bois, deceased in the capacity of book-keeper and accountant during the period from March 4th, 1876 to August 4th 1881.

Q. 2. During the period in which you were in the employ of Mr. Du Bois and had charge of his books; in what capacity was Edwin F. Bugler in the employ of John Du Bois, and to what portion of the works were his duties confined?

(Objected to as incompetent, not in answer to complainant's testimony and for the reasons above referred to.)

A. He was foreman of the machine shop and his duties were chiefly confined to that department.

Q. 3. During the time that you were in the employ of Mr. John Du Bois did you visit the improved dams on his property, or any of them, and if so, how were the plank on the lower end walls of the fore bay arranged to the best of your recollection?

(Same objection as above.)

A. I frequently visited the dams and especially the dam called the chamber of commerce dam, the one at or opposite the foot of the lane, to exhibit it to persons who were curious to see how it worked. To the best of my recollection the planking in the lower end of the fore bay or flume, as we used to call it, were arranged horizontally.

Q. 4. State, if you remember, when the telegraph office was first established, or if it was in existance when you first came to Du Bois, and also if it continued to exist up to the time you left?

(Same objection as above.)

145 A. The telegraph office was in operation at the time I came here and seemed to be all the time that I stayed here?

Cross-examined by J. H. BAKEWELL, subject to the same protests and objections as were made to the depositions of the previous witnesses—C. C. Brenneman and Charles Loring:

X Q. 1. When did you leave the employ of Mr. Du Bois?

A. On the 4th day of August, 1881.

X Q. 2. Which dam do you mean by the Chamber of Commerce dam?

A. What I understand by the Chamber of Commerce dam is the one that was visited by the committee from the chamber of commerce from Pittsburgh. They came up here to see a dam in opera-

tion. That was at the time that they were talking of putting in a dam at Davis island, in the Ohio river. Mr. Du Bois had the idea of getting a contract to put in the dam at Davis island if he could.

X Q. 3. When did you first hear that dam called the Chamber of Commerce dam?

A. I cannot tell. It might have been shortly after they were here or it might have been a year or perhaps two years.

X Q. 4. I understand you to say that it was commonly called the Chamber of Commerce dam before you left Du Bois?

A. I can't say that it was commonly called that, I have heard it called that quite frequently.

X Q. 5. What was the position of the planks in the side walls of the fore bay of that dam?

A. To the best of my recollection they were all horizontal, the same as the end walls were. The timbers to which they were spiked were perpendicular.

X Q. 6. What was the position of the boards at the upper end of the fore bay?

A. So far as I could see they were the same as those at the lower end.

X Q. 7. What was the position of the planks forming the
146 gates of the dam?

A. The upper gate was hinged to the bottom at the upper end, the lower gate was hinged to the bottom at the lower end, to the down-stream end of the upper gate was hinged a leaf that lapped over the lower gate.

JAMES C. BEARD.

E. B. NETTLETON sworn.

(Mr. Bakewell objects to the taking of the deposition of this witness for the same reason as before stated by him in objecting to the deposition of C. C. Brenneman.)

Q. 1. State your name, age and occupation at the present time and your residence and occupation since 1876?

A. Name, E. B. Nettleton; age, 28 years; at present in the employ of John E. Du Bois in the general office; from 1876 until May, 1882 I was in the employ of the A. V. R. R. Company as freight and ticket agent in this town, since that time to the present, I have been in the employ of John Du Bois and John E. Du Bois, and I have resided in Du Bois, Pa. since 1876 to the present time.

Q. 2. State whether not there was maintained at the station, during your services with the A. V. R. R., any telegraph office and how long it existed at Du Bois station?

(Objected to as incompetent, not in answer to complainant's rebutting testimony and for the reasons above referred to.)

A. There has been a telegraph office at the station at Du Bois from 1876 to the present time.

Q. 3. State whether or not during the years 1880 and 1881, the business men or the general public could be accommodated in receiving and sending telegrams at that office?

(Objected to for the reasons above stated and as being
147 irrelevant.)

A. They could.

Q. 4. State whether or not the office at the station, during the period you have mentioned, was or was not an office for public or general use, and also by what telegraph company it was maintained if you know, also what if any connection you had with said telegraph office.

(Objected to for the reason above stated and as being irrelevant.)

A. The office was maintained both for the use of the railroad company and the general public, I had general charge of the office and being an operator had at times immediate charge of the office. The operator in charge represented the railroad company's telegraph and the Western Union Telegraph Company.

Cross-examined by J. H. BAKEWELL, subject to the same protests and objections as were made to the depositions of the previous witnesses, C. C. Brenneman and Charles Loring:

X Q. 1. What was the size of Du Bois in the year 1881?

A. I should judge about 3,000.

X Q. 2. What was the employment of most of the population at that time?

A. A large proportion were the laboring classes employed as coal miners, mill and woodsmen.

X Q. 3. Was not the greater part of the population in the employ of John Du Bois?

A. I think not.

X Q. 4. What was about the proportion of those directly or indirectly in the employ of John Du Bois to the rest of the population?

A. I would not attempt to say, a large portion of the population was employed either directly or indirectly by John Du
148 Bois.

X Q. 5. Who at that time owned the land adjoining and surrounding the telegraph office at Du Bois?

A. Various parties, the larger part in the immediate vicinity was owned by John Du Bois.

X Q. 6. How far was the residence and hotel of John Du Bois from the telegraph office?

A. Both of them within 1,000 feet.

X Q. 7. How far was the office and the different mills and work shops of John Du Bois from the telegraph office?

A. The office approximately 500 feet, the mills and work shops within a radius of three-quarters of a mile. The machine shop and foundry is about 500 feet distant across the street, the mills and box factory situated within the lumber-yard inclosure southwest of the telegraph office and not over three-quarter- of a mile distant, that includes all the mills and work shops, all the principal mills and works shops.

X Q. 8. How far was the telegraph office at that time from the

main town of Du Bois and how far was Brookville from the same place?

A. It is fully three-fouths of a mile, to Brookville it is 24 miles.

X Q. 9. Is Brookville on the direct line of railroad between Du Bois and Pittsburgh, I mean Brookville station?

A. Yes, sir.

X Q. 10. Did not the residence of John Du Bois, his hotel, office and work shop form a cluster of buildings around the telegraph office and at some distance from the main town of Du Bois?

A. The residence and hotel are situated near the telegraph office, the principal saw-mills and box factory were situated between the telegraph office and the larger business portion of the town, probably about equal distant from both.

T. H. B. Patterson, attorney for defendant, states that this witness and Charles Loring, W. A. Butler, J. O. Lithgow, N. L.
149 Hoover and James C. Beard, were all included in the offer made of C. C. Brenneman as are the other witnesses to be called, and I now notice that the said offer of these witnesses was omitted in the statement of the offer as taken down and now state that all said witnesses were called and examined for the same purpose as C. C. Brenneman and the offer made of C. C Brenneman is hereby made of all of these witnesses.

Complainant's counsel objects to this notice as being too late, and objects to the depositions for the further reason that up to the time of taking the same, no notice was given to the complainant or his attorneys of what the defendant expected to prove.

E. B. NETTLETON.

GEORGE R. VOSBURG sworn.

(Mr. Bakewell objects to the taking of the deposition of this witness for the same reason as before stated by him in objecting to the deposition of C. C. Brenneman.)

Q. 1. What is your name, age, occupation and residence, and state for what period you have been in the employ of John Du Bois and John E. Du Bois and what is your position?

A. My name is George R. Vosburg; age, 58; occupation, business man for Mr. Du Bois; residence, Du Bois, Pa. I began with the late John Du Bois in April, 1866 and have been with him and his successor continuously since that time.

Q. 2. State what was the position of Edwin F. Bugler while in the employ of John Du Bois, deceased, and to what department of the works his duties extended?

(Objected to as incompetent, not in answer to complainant's rebutting testimony and for the reasons above referred to.)

A. His position at Du Bois was foreman of the machine
150 shop, and his duties extended to the repairs of machinery and general supervision of the work in the machine shop.

Q. 3. State whether or not you ever knew of Edwin F. Bugler building any of the dams on the creek on the Du Bois property during the lifetime of John Du Bois?

(Same objection as above.)

A. I never knew him to have anything to do with the construction further than the shop work.

(The deposition of this witness is objected to as utterly irrelevant and trifling and as affording no proof of any fact whatever, for these reasons and for the reasons above stated the complainant's counsel declines to cross-examine.)

GEORGE R. VOSBURG.

D. D. MOORE sworn.

(Mr. Bakewell objects to the taking of the deposition of this witness for the same reason as before stated by him in objecting to the deposition of C. C. Brenneman.)

(T. H. B. Patterson, attorney for the defendant, offers the witness called for the same purpose as stated in the offer of the testimony of C. C. Brenneman.)

Q. 1. State your name, age and occupation, and also in whose employ you are at the present time?

A. My name is D. D. Moore; my age is 45 years; occupation, carpenter; and I am in the employ of John E. Du Bois at the present time.

Q. 2. State whether or not you had anything to do with building the old bear-trap dam visited by the excursion of the chamber of commerce and others from Pittsburgh, and if you had anything to do with it, state what, to the best of your recollection, was
151 the arrangement of the lower end wall of the fore bay, whether the plank were straight up and down or crosswise?

(Objected to as incompetent, not in answer to complainant's rebutting testimony and for the reason above referred to, also objected to for the further reason that the deposition of this witness with regard to this dam has already been taken and has been closed.)

A. I helped to frame and lay out the timbers for the dam and also helped to put it in. The plank of the lower end wall of the fore bay were crosswise, I never helped to put in any up and down.

Cross-examined by J. H. BAKEWELL subject to the same protests and objections as were made to the depositions of the previous witnesses, C. C. Brenneman and Charles Loring:

X Q. 1. What name do you give to the dam that has been mentioned in your direct examination?

A. We called it the Jo. Hand dam at that time, some call it the Twin dam; that is what I always called it.

X Q. 2. What other names have been given to it?

A. I always called it the Jo. Hand dam. It was also called the Twin dam. There has been no other names that I know of?

X Q. 3. Did you ever hear it called the Chamber of Commerce dam?

A. No, sir; I never did.

X Q. 4. What name do you give to that dam three and one-half miles from Du Bois station on Narrows creek, neath the railroad?

A. I do not know what name they did give to that dam, there was a number to it but I do not know what number it was.

X Q. 5. Did you assist in building that dam?

A. Yes, sir; I did.

X Q. 6. Did you work on it until it was completed?

152 A. Yes, sir.

X Q. 7. State the date of its completion and whether it had a third leaf at that time?

A. I cannot state the date of it's completion, I presume it might have been five years ago, might have been less than that, I think it was somewhere about that time. I cannot state whether that had a third leaf or not but think it did, to the best of my recollection it had.

(Objected to on behalf of the defendant as not proper cross-examination.)

X Q. 8. On what principle was that dam constructed?

A. The principle was just the same as the other dam, that is the principle of the gate.

X Q. 9. Was the construction of this dam in its essential principles the same as the Jo. Hand dam?

(Objected to as not proper cross-examination.)

A. It was only on a smaller scale.

X Q. 10. How were the planks of the fore bay of this dam arranged, and particularly the planks of the lower end wall of the fore bay?

A. The lower end wall of the fore bay, that is the wall in which the wicket is, the planks were put on crosswise, some of the dams may have been remodelled since I have been by them, and I know that that one was.

X Q. 11. How do you know that the dams were remodelled?

A. Because I framed the timbers to do it.

X Q. 12. When was any remodelling of the fore bay made?

A. I cannot tell just when, most every summer we frame timbers for remodelling dams.

X Q. 13. Do you do any other work than making the frames of the dam? Do you do any work in the fore bay of the dam?

153 A. I hav-n't of late, I used to. For the last two years I have not been working on the creek.

X Q. 14. What particular work did you do on the dam in Narrows creek when it was built?

A. I helped to put in the frame and side them up and put in the gates.

X Q. 15. Have you ever done any repairing on this dam?

A. No, sir; I never helped to repair these any more than framing the timbers.

X Q. 16. Have you ever framed any timbers or done any work that could be used in repairing the fore bay to this dam?

A. No sir; after the frame of the dam is in there is no framing to be done unless the frame be entirely washed out.

X Q. 17. Then you cannot state from your own knowledge or from the work that you have done, whether the fore bay of this dam in Narrows creek has been repaired or remodelled since it was built?

A. No, I can't.

X Q. 18. Specify of your own knowledge, what changes or repairs have been made to this dam since it was built?

A. I could not say, I have not been there for three years and have no knowledge of any repairs in particular. I have not seen it since it was built except in passing along by it on the railroad.

X Q. 19. Had it a third leaf when you saw it last?

(Objected to as not proper cross-examination.)

A. It had.

X Q. 20. When did you see it last and notice that it had a third leaf?

A. When it was built.

X Q. 21. What are you working at now?

A. I am working at building bottoms to pile lumber on in the lumber yard.

D. D. MOORE.

154 W. I HORN sworn.

(T. H. B. Patterson, attorney for the defendant, offers the witness called for the same purpose as stated in the offer of the testimony of C. C. Brenneman.)

(Mr. Bakewell objects to the taking of the deposition of this witness for the same reason as before stated by him in objecting to the deposition of C. C. Brenneman.)

Q. 1. State your name, age, residence, occupation and in whose employ you are?

A. W. I. Horn; age, 32; residence, Du Bois, Pa.; occupation, log driver; and am in the employ of John E. Du Bois.

Q. 2. State whether or not you use dam No. 5 shown on "Exhibit Kirk Map," on the creek just above the lane, and the other Du Bois dams whereon there are sand flumes or washouts, and if so state how high the lower end walls of said washout, on all of said dams are with regard to the height of the upper end walls of the fore bays on said dams; are they the same height, or higher or lower?

(Objected to as incompetent, not in answer to complainant's rebutting testimony and for the reasons above referred to.)

A. I have used No. 5 dam and the other dams referred to. The lower end walls are about as high as the upper ones.

Cross-examined by J. H. BAKEWELL subject to the same protests and objections as were made to the depositions of the previous witnesses, C. C. Brenneman and Charles Loring:

X Q. 1. State what has been the nature of your work on dam No. 5?

A. Driving logs. When there is a splash in the dam we let the water off and run the logs through the dam down the creek.

155 X Q. 2. When was the last splash in that dam?

A. This morning.

X Q. 3. Were you there this morning?

A. Yes, sir.

X Q. 4. When was the splash before that?

A. Day before yesterday.

X Q. 5. How long have you been at work at dam No. 5?

A. Since last fall.

(In connection with the testimony of this witness, complainant's counsel calls attention to the fact that since the meeting held in Du Bois in March, 1887 for the taking of defendant's proofs, the wooden exhibit, defendant's model, has been tampered with or changed in a material point, to wit, that the height of the lower end wall of the sand washout flume, which was formerly of the same or substantially of the same height as the lower end wall of the fore bay, has been altered by the addition of another piece of wood nailed to the model making it as high as the upper end wall of the flume. Complainant's counsel protests against said change and demands that it be corrected. Complainant's counsel desires to call attention to the fact that after this protest was made defendant's counsel removed the piece of wood that had been nailed to the model, thus bringing the exhibit in the same condition as when filed in this case.)

(T. H. B. Patterson, attorney for the defendant, states in reply to the above complaint, that the new pieces of wood on the model were put there simply for use in argument and illustration and that he directed them not to be in any way attached to the model, that as soon as his attention was called to the fact that any of them had been attached he immediately had them removed, and that the model, prior to the entering of this complaint, was in the same condition as when it left the office of Mr. T. W. Bakewell, complainant's attorney, but at the time it left T. W. Bakewell's office it was not in the same condition as it was when it was offered in evidence,

156 some portion of the lower end walls of the model having been removed before it was brought away from the office of T. W. Bakewell day before yesterday.)

(Mr. Bakewell denies that the said board was nailed to the model when it was in his office.)

W. I. HORN.

Cross-examination of W. I. HORN continued after adjournment:

X Q. 6. Describe the condition of the lower end wall of the sand washout and the position of the planks forming the same of dam No. 5 on "Exhibit Kirk Map," when you were there last fall?

A. About four or five feet of it the plank stand up and down and the balance of it the planks are crosswise. The boards were in good condition.

X Q. 7. You state that the vertical boards were four or five feet high, how high were the transverse boards?

A. I could not say how high they were, the balance on the top of the others make the whole height of the flume.

X Q. 8. What was the position last fall of the planks constituting the upper end wall of the sand washout on dam No. 5, and is it the same now?

A. The upper end is a solid wall. I cannot say whether the planks were up and down or not as I never paid any particular attention to it.

X Q. 9. How is it that you are aware of the position of the planks of the lower end wall of the washout?

A. You can see them every time you hoist the gate.

X Q. 10. Cannot you as readily see the planks at the other end of the sand washout?

A. There are boards laid over the upper one and I paid no particular attention to it, the one wicket has a handle on and the other raises straight up. The purpose of the boards is to
157 walk on in crossing the dam and in working it.

X Q. 11. What is the position of the planks in the upper and in the lower end walls of the fore bay of that dam?

A. The lower one is up and down, the upper one I could not say.

X Q. 12. State the reason for the lower end wall of the sand washout flume being formed partly of planks up and down and partly crosswise.

(This question objected to for the reason that the witness, not being a professional witness or expert, cannot give the reason for the alleged facts but is confined in his evidence to the proof of facts alone.)

A. I don't know; I never asked why they were put on in that way.

X Q. 13. State whether the lower end wall of the sand washout flume was in the same condition last fall that it is now.

A. Just the same to the best of my knowledge.

X Q. 14. Was the lower end wall of the sand washout higher last fall than the lower end wall of the fore bay?

A. It was higher.

X Q. 15. About how much higher?

A. From 2 to 3 feet.

X Q. 16. Were any of the crosswise planks of that wall removable?

A. I paid no attention to them to know whether they could be removed or not.

X Q. 17. Did you not pay any attention to know whether they were loose or fastened by nails or otherwise?

A. No, sir; I did not.

X Q. 18. Do you know whether those boards were loose or fastened when you visited the dam yesterday?

A. I do not.

X Q. 19. How was it that you did not notice that fact at any
158 time, when you state in order to raise the wicket of the sand washout you had to be immediately above the lower end wall?

A. I never paid much attention to it for it is only once in a while that I open the wicket.

X Q. 20. Then you very rarely have occasion to notice the lower end of the sand washout at all?

A. Not often or very seldom.

X Q. 21. How much higher is the upper end wall of the sand washout in this dam than the lower, or what are their relative heights?

(Object to the question as the witness has been asked the same question in substance and has answered it.)

A. They are about the same height.

X Q. 22. What is the height of the upper end wall of the fore bay in regard to the height of the lower end wall of the sand washout of this dam, No. 5?

A. Near about the same.

X Q. 23. Do all of your previous statements with regard to the sand washout in this dam, No. 5, apply equally well to the other dams provided with sand washouts, and are all these dams constructed in substantially the same manner?

A. All my statements apply to the dams provided with sand washouts and they are all constructed in substantially the same manner.

X Q. 24. Do you know the dam three and a half miles from Du Bois station toward Driftwood beneath the railroad, and state whether you have worked on it?

A. I know the dam and have worked on it, that is have driven logs through it. I didn't work on building it.

X Q. 25. Are the end walls of the fore bay of that dam constructed in the same way as the end walls of the fore bay of dam No. 5, "Exhibit Kirk Map"?

A. Yes, sir.

X Q. 26. What is the position of the planks of both the
159 end walls of the fore bay of the dam on Narrows creek 'neath the railroad?

A. The lower one is up and down, the upper one I could not say.

X Q. 27. When did you last visit that dam?

A. A week ago Monday.

X Q. 28. What was the state of the lower end wall of the fore bay at that time?

A. I did not look at the fore bay at all at that time, I went there for the purpose of looking at the stage of the water and then walked away.

X Q. 29. Did you not observe whether or not there was any leak in the lower end wall of the fore bay?

A. No, sir.

X Q. 30. Have you at any recent time looked at the lower end wall of the fore bay of that dam and do you remember of examining it at any time?

A. I never examined it, I mean that I never examined it particularly.

X Q. 31. What was the state of the water in the dam when you went to the dam last Monday a week, and what was the position of the gates?

A. The dam was full of water, I did not go to the gates at all.

X Q. 32. Whose employ are you in now?

A. John E. Du Bois'.

W. I. HORN.

WILLIAM MIX sworn.

(Mr. Bakewell objects to the taking of the deposition of this witness for the same reason as before stated by him in objecting to the deposition of C. C. Brenneman.)

Q. 1. State your name, age, residence, occupation and in whose employ you are?

160 A. William Mix; age, 27; residence, Du Bois, Pa.; occupation, common laborer; and am in the employ of John E. Du Bois.

Q. 2. State whether or not you used dam No. 5 shown on "Exhibit Kirk Map," on the creek just above the lane, and the other Du Bois dams whereon there are sand flumes or washouts, and if so state how high the lower end walls of said washout on all said dams are with regard to the height of the upper end walls of the fore bays on said dams, are they the same height or are they higher or lower?

(Objected to as incompetent, not in answer to complainant's rebutting testimony and for the reasons above referred to.)

A. I have used the dams, and the lower end walls of the sand ·icket and the upper end walls of the fore bay and sand washout .re all about the same height.

Cross-examined by J. H. BAKEWELL, subject to the same protests and objections as were made to the depositions of the previous witnesses, C. C. Brenneman and Charles Loring:

X Q. 1. What is the nature of your work on dams?

A. When I am at the dam I sluice logs through the dam.

X Q. 2. Do you have to raise or lower the wickets of the dam?

A. I do provided I have to raise or lower the dam. My general work is to drive the logs through the dam.

X Q. 3. What is the position of the planks of the lower end wall of the sand washout flume and also of the lower end wall of the fore bay of dam No. 5?

A. I have not taken particular notice of the dam and cannot say how the planks are put in.

X Q. 4. Have you noticed whether any part of the lower end wall of the sand washout flume is removable or not?

A. There are no loose boards on there.

161 X Q. 5. How then are the boards fastened?

A. They are either spiked or nailed on.

X Q. 6. What are these boards nailed or spiked to?

A. They are spiked or nailed to timbers connected with the dam, that is as near as I can explain it.

X Q. 7. How often do you have to operate the sand washout wicket yourself?

A. Whenever I open the dam I open the sand wicket. I cannot state how often, sometimes I am sent to open the dam and sometimes some one else is sent.

X Q. 8. Is it very often or very seldom that you open the sand wicket?

A. I might say often.

X Q. 9. When was you last at the dam and near enough to the lower end wall of the sand washout to observe it?

A. I was there on the 25th of this month.

X Q. 10. Why did you go down there at that time?

A. We walked right across the dam as we came down the creek, I mean the crew that I work on.

X Q. 11. Did you notice the height of the lower end wall of the sand washout at that time?

A. No, sir; I did not.

X Q. 12. What was the height of the lower end wall of the sand washout at the beginning of the spring, say about March?

A. It was about the same height as the upper end wall of the washout and of the upper end of the fore bay.

X Q. 13. Was there much water in the creek then, say about the beginning of March?

A. I think there was a very good water in the creek about the first of March.

X Q. 14. Was the water going over the comb of the dam then, that is over the top of the gate?

A. Yes, I saw the water running over the top of the gate in March.

X Q. 15. Was it also going over the walls of the lower end
162 of the fore bay and the sand shute?

A. There was water going over the lower end of the fore bay but not over the sand shute. I never saw it going over the lower end wall of the sand shute.

X Q. 16. Do you know the dam on Narrows creek 'neath the railroad?

A. Yes, I have been at the dam.

X Q. 17. Have you ever raised or lowered the wickets there?

A. Yes, I have raised and lowered the wickets.

X Q. 18. What was the position of the planks of the end walls of the fore bay of that dam?

A. I did not take any particular notice of the dam and cannot tell.

X Q. 19. Was there any leak in the lower end wall of the fore bay of the dam?

A. Not that I recollect of.

X Q. 20. When did you last visit the dam on Narrows creek 'neath the railroad?

A. I cannot state no date, have been there several times during the spring.

X Q. 21. Was there at that time enough water in the creek to raise the gates or leaves of the dam, and was there any overflow over the lower end wall of the fore bay?

A. Yes, there was enough water to raise the gates but there was none running over the lower end wall of the fore bay that I recollect of.

X Q. 22. Were the leaves raised then, at the time you visited it in the spring?

A. They were raised at some of the times when I was there.

X Q. 23. Was, at that time, any water running out of the fore bay or over the lower end wall?

A. Not that I recollect of.

X Q. 24. How long have you been engaged about the dams?

A. I have been driving on Sandy and its tributaries since 1884.

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X Q. 25. What were you doing before then?

A. I was working in the lumber woods.

X Q. 26. Have you always been engaged as a day laborer?

A. No, not always.

X Q. 27. What was your previous occupation before you became a common laborer?

(Question objected to as not proper cross-examination and as incompetent and irrelevant.)

A. I used to job.

WILLIAM MIX.

PITTSBURGH, *June 30th*, 1887.

Met pursuant to notice.

Present: T. H. B. Patterson, Esq., for defendant and T. W. Bakewell, Esq., for complainant.

C. F. FULLER, a witness produced on behalf of defendant in surrebuttal, being duly sworn, deposes and says as follows:

(Defendant offers the witness called and proposes to examine him in surrebuttal and rebuttal of matters and facts proven by the complainant in his testimony heretofore offered.)

(Mr. Bakewell objects to the taking of the deposition of this witness and generally to the taking of any testimony on the part of the defendant at this stage of the cause. The defendant has already disclosed his evidence and the present depositions are unauthorized and contrary to the rules of equity practice. Mr. Bakewell renews his notice that at the hearing of this cause he will move the court to strike from the record the deposition of this witness and the other depositions now intended to be taken and to put the costs thereof upon the defendant.)

Q. 1. State your name, age, residence and present occupa-
164 tion?

A. C. F. Fuller; age, 48 years; residence, Du Bois, Pa.; occupation, overseer for John E. Du Bois.

Q. 2. State who built and superintended the actual building of the improved bear-trap dam on the creeks in the Du Bois property during the lifetime of John Du Bois.

A. There were a number of men that helped to build them, John Du Bois superintended them all except one and I superintended that one.

Q. 3. Was Edwin F. Bugler one of the men who superintended or help build any of the dams mentioned in the last question?

A. I never knew him to superintend or help build any more than draw the drawing of the dam under Mr. Du Bois' directions.

Q. 4. State what kind of sketches these were that you refer to, and also state whether or not you took part in the building or helping to build all of the dams built by John Du Bois in his lifetime at the Du Bois property?

A. The drawings that he would give us for building dams, would be just merely a drawing of the foundation with figures showing the distance for timbers of the foundation to be laid apart. This is such a sketch as we had to build them by. It would be a sketch showing the foundation. I helped to build all of the bear-trap dams built by John Du Bois on his property.

Q. 5. State whether or not any of the sketches or plans furnished to the men building the bear-traps dams by Mr. Bugler, showed the exact details of the superstructure, planking, &c.?

A. I never saw any that did.

Q. 6. State how the planking was arranged on the lower end wall of the fore bay of the earlier improved bear-trap dams built by John Du Bois on the creeks on the Du Bois property?

A. Horizontal or crosswise always.

Q. 7. Designate and identify, in any way you can, the im-
165 proved bear-trap dam which was torn out by Brenneman and Butler last fall; state whether or not you ordered the tearing out of said dam?

A. I did. It generally went by the name of the Johann dam. It was the dam visited by the chamber of commerce.

Q. 8. State whether or not this is the dam on which Charles Loring worked in the building thereof?

A. Charles Loring was one of the men who built that dam.

Q. 9. State what is the condition of the lower end wall or bulkhead of the dam No. 8 on "Exhibit Kirk Map," near the railroad on Narrows creek with regard to water-tightness and rotten-ess of the planks, also what its condition was on the 10th day of March, 1887, and from that period up to the present time so far as you know it?

A. It was good when I last saw it. I examined it last Sunday. It was tight. I didn't examine the planks to see whether they were rotten or not. If they were rotten they wouldn't have held the water. They held the water. Its condition was good on the 10th day of March, 1887, that's the day we looked at it. I guess it has been good for there has been no repairs made on it that I know of; if there had been I would have been apt to have known of it.

Q. 10. State whether or not the said dam has been used for driving logs from the 10th of March up to the present time in the usual manner?

A. Yes, sir.

Q. 11. State what are the heights of the lower end wall of the sand flumes or washouts on dam No. 5, "Exhibit Kirk Sketch," and the other improved bear-trap dams on the Du Bois property whereto sand flumes are attached?

A. The heights of them are above high-water mark.

Adjourned to July 1st, 1887, at 9 o'clock, a. m.

PITTSBURGH, *July 1st*, 1887—9 a. m.

166 Met pursuant to adjournment.

Present: Counsel as before and J. H. Bakewell, Esq., for complainant.

X Q. 12. State what part you have taken in the construction of the dams at Du Bois beginning at the first, and give the names of all the men who worked on said dams and the different parts they took in the construction?

A. I was foreman on the dams. I put the dams together. The Chamber of Commerce dam has a long history. We first started for a different dam from the one we ended up on. That different dam wouldn't work. There were 11 bents raised on the first dam, then there was a crib-work raised. I made the measurement for placing the timbers in the bottom of the dam, dug out the foundation and then we raised our 11 bents after we got our 11 sills on. We then leveled off and made a floor over the whole bottom of that dam, we then put up what we call a crib inside, a crib is timbers laid up and down and crosswise on the top of the floor. We then filled that crib with earth, stone and gravel. We then laid another floor on top of that. We then strung our hinged bar and hinges on hinge sills. We boarded up the sides, we then put on our gates, we then put in our wickets and fore bay. After we hang the gates we put the stops on. All the banking and cribbing is going on at the same time. I was overseer and lent a hand when it was necessary, what any overseer would do. It requires a great deal of

watching as there are a great many parts to come in that must go right.

X Q. 13. Was that the character of your work on the old Johann dam or Chamber of Commerce dam and dam No. 8?

A. Yes, the same character of work as on the first dam. On dam No. 8 I was there from beginning to end. I may say in regard to the first Johann dam that I did not have charge of the first part but took hold of it and finished up the bear-trap dam. The fore bay was always the same, we did not change that.

X Q. 14. What part did you change?

167 A. We changed the gates and lower end wall of the fore bay.

(Mr. Patterson insists that the witness'es explanation to the last two questions go down on the record, and also objects to more than one counsel for complainant cross-examining and that the cross-examination be conducted throughout by one counsel.)

X Q. 15. State in what shape the timber used in putting up the dam came to you at the dam?

A. The first four dams that we built came to us in the rough just as we sawed, came right from the saw-escape boards, or planking that was surfaced on one side. These dams were the Chamber of Commerce dam and dam No. 8 on Narrows creek. On dam No. 8 we worked the timber all at the mill on a platform for we had no machinery at that time. The first two were the Chamber of Commerce dams the Johann dams or whatever you have a mind to call them, the next was the McCracken ditch dam, the next were the two Shaffer dams, on those we worked the timber right in the woods at the dam. The dam at Narrows creek we worked at the mill, but we took it in the rough and worked it by hand. I think the rest of them were pretty near all worked by machinery.

X Q. 16. Then with regard to the dams later than the ones you have named, did the timber come already cut and in proper shape for setting up and fixing at once?

A. It pretty near came already, that is the timber came already?

X Q. 17. That was all done before it came into your hands?

A. Yes.

X Q. 18. Did the gates come to the dam already made and in proper shape?

A. On those dams that were made later they did. We would have to change them sometimes, they wouldn't fit perfectly. The packing piece was something that could not be made and brought there, we had to make it there.

168 X Q. 19. Did you ever yourself do any work on the gates in making them at the dams?

A. Yes, sir. I have sawed gates, I have hewed gates, I have cut gates and I have worked them in every shape at the dams themselves, the first dams we built.

X Q. 20. Did you have a special set of men to make those gates at the dams?

A. We had at the first gates; there were men there by the names of John Drummond, Dan Moore and John Hawk. They were first-class carpenters or millwrights. They helped to build six dams in one season.

X Q. 21. Then these men constructed the gates and you oversaw the putting them in their place?

A. Yes, sir, and I oversaw the construction of them too.

X Q. 22. Were there ever any plans made of the dams or any of them, either for the use of Mr. Du Bois or otherwise?

A. He has a number of drafts, profiles of dams to show to people. No profile in full of any of the dams we built on his property, that is none that I have seen; that is dams that I had charge of.

X Q. 23. Did Mr. Du Bois have no plans to guide him in the construction of the dams?

A. Yes, sir.

X Q. 24. What kind of plans were these?

A. The first dam that we built was the plan all the way through, that is the Chamber of Commerce dam. That was cut and tried and we took that for a sample and built our dams after that.

X Q. 25. For how long were the dams built with fore bays of which the lower end walls were horizontally planked?

A. There are three of those dams that have planks horizontally, and I don't know but there are more. We planked them horizontally until about the year 1880 or 1881. I think the last dam was the McCracken ditch dam. It is so long ago that I can't remember, I know those three dams were planked that way because I have noticed them lately.

169 X Q. 26. How do you plank them now?

A. Up and down to within 18 or 20 inches of the height that the gate rises.

X Q. 27. For how long have you so planked them and give the first dam?

A. Since 1881 or 1882. The Shaffer dams were first I think.

X Q. 28. How were the horizontal planks above the vertical planks arranged, are they arranged in guide-ways?

A. They are put on loose between cleats?

X Q. 29. You say that there were no recent repairs on the lower end wall of the fore bay of dam No. 8 on Narrows creek, is then this wall the same which you originally built in making that dam?

A. I think it is.

X Q. 30. As you have been overseer of all of these dams, I suppose you have considerable mechanical knowledge?

A. I have some mechanical knowledge of some things. I have considerable knowledge of building bear-trap dams and in iron moulding.

X Q. 31. Then I suppose you can make a drawing, are a pretty good draftsman?

A. I am not a draftsman although I could draw a dam so that I could build it.

X Q. 32. Will you make a drawing of the lower end wall of the fore bay of dam No. 8 on Narrows creek as it stands now?

A. I could not make one because I am not enough of an expert draftsman to make one. The situation of the wall is such that I could not make it. It would require an expert draftsman to make it. The side walls of the flume would keep me from drawing a draft to show it. I wouldn't attempt to make it.

X Q. 33. In order to make a sketch of that wall of the fore bay, showing its exact condition, how would it be necessary to approach it?

170 A. He can come in from the top of it, or behind it, or before it.

X Q. 34. Would it be necessary to go down into the fore bay?

A. No, I suppose you could stand on top of it or back of it, stand anywhere where you could see it.

X Q. 35. Could you show its condition by merely viewing it from the top?

A. No, I don't believe you could by standing on top of it. That is to make a bird's-eye view.

X Q. 36. Is not this dam No. 8 nearly worn out?

A. The gates and some boards on the side walls need repairs, that is one plank on the gates and some planks on the side walls, but nothing to interfere with the working of the dam.

X Q. 37. With respect to the fore bay, what is its condition, is it not nearly worn out?

A. The fore bay, both upper and lower, was all right last Sunday. It does not need any repairs that I could see. I inspected it last Sunday, looked down and inspected it.

X Q. 38. When was this dam No. 8 built?

A. I could not say accurately. It was built in 1880 or 1881, I could not say positively. If I was home I could tell exactly as I have a record of the date.

X Q. 39. Describe minutely the extent and purpose of your inspection of dam No. 8 last Sunday?

A. I went up there to see whether it was all right to drive logs, we have about 3,000,000 feet of logs to drive out of there. I also inspected the two dams below to see if they were all right. The extent was to see whether they were all tight and in good working order. In this low water we have to have them tight, tight as we can make them.

X Q. 40. How much water was in that creek last Sunday?

A. I should say about two feet, there might be more.

X Q. 41. Was there sufficient water to raise the leaves of the dam to their full height?

A. No, sir.

171 X Q. 42. How high would they go?

A. They might go up three feet from the floor. The full height is about four and one-half feet.

X Q. 43. Was the water in the fore bay at its normal height or full height in the fore bay?

A. The water in the fore bay was the same height as the water in the pool. It was not at its full height. The full height would be

up to the top of the lower end wall of the fore bay. It was near as high as the lower end wall of the fore bay.

X Q. 44. How do you know, then, that the water would not have leaked through the lower end of the fore bay wall if the fore bay had been full, as it is in normal stages of the water in the creek?

A. Because I could see no chance for it to leak above the wicket gate, and it did not leak at the wicket gate, because that I could have told because it was covered with water.

X Q. 45. If you could make a sketch sufficient to construct a dam, can you not make me a slight sketch showing the planks in this fore bay wall?

A. No, sir. I would not attempt it.

X Q. 46. Is not the wall of the fore bay made just like an ordinary wooden wall of a house, so that any person could draw a line showing the position of the boards, their relation to one another and the parts where they meet, as they appear in elevation?

A. It appears like the wall of a house up to within eighteen or twenty inches of the height to which the gates rise, and then it has one or two cross-boards arranged on top of these. They generally have cleats to slide down in between. I should think an ordinary person could draw that.

(Witness proceeds to make two rough sketches of the lower end wall of the fore bay in side elevation.)

X Q. 47. In the larger sketch you have drawn one horizontal board above the vertical boards, does this board go entirely
172 across the end of the fore bay of this dam No. 8, this sketch being as I understand, a rough sketch of the lower end of the fore-bay wall of that dam?

A. It might or might not. If there was a board sticking up above the height of this cross-board there would not need to be one. But as a general thing they do.

X Q. 48. Can you say positively whether on this dam No. 8 the transverse board goes across the entire width of the fore bay, or whether there are any vertical planks such as described in your previous answer?

A. I could not say, there may be a vertical board sticking up there. But I know the dam works.

X Q. 49. What is the reason for the vertical boards being sometimes left sticking up in that position?

A. That may be the way they are put on, and then sawed off at that cross-piece.

X Q. 50. Can you mention any other dams in which the vertical boards stick up in the same way?

A. There might be and there might not. I never noticed.

X Q. 51. Is not the structure of dam 8 such that a special and careful examination of the lower end wall of the fore bay would be necessary in order to ascertain its exact condition?

A. That would be so with any dam and every dam. My answer is yes.

X Q. 52. Please give the exact date of tearing out the Johann dam?

A. I could not give the exact date to the day. I could if I was home. It was in the month of September, 1886. It might have been in the forepart of October. It was either the latter part of September or forepart of October.

X Q. 53. Was this dam ever called the Chamber of Commerce dam before the commencement of this suit?

A. It was never called that with us, although I have heard people speak of it as the dam that the chamber of commerce visited. Mr. Kirk called it the Chamber of Commerce dam and I have heard different ones call it the Chamber of Commerce dam
173 or the dam that the chamber of commerce visited.

X Q. 54. When you say some other people do you not mean people visiting the dam from Pittsburgh and other places?

A. That's the way I should think it was, and still there might be some of our people call it that. I have heard it called that. I think Mr. Kirk always called it that.

X Q. 55. Who among your people at Du Bois called it the Chamber of Commerce dam?

A. I could not say. The thing is of so little importance I would not give it a second thought.

X Q. 56. Was the term often used by them?

A. I didn't hear it very often.

X Q. 57. Who ordered you to tear out the Johann dam?

A. Nobody.

X Q. 58. Why did you tear it out?

A. Beceause it was worn out and fit for nothing. There have been about 30,000,000 feet of logs a year run over that dam. I think there have been about 300,000,000 feet of logs run over since it was built.

X Q. 59. Do you use your own discretion as to tearing out or removing dams?

A. I did on that.

X Q. 60. Have you done it on any other occasion?

A. Yes, once, on the Tom Keen dam.

X Q. 61. Who usually gave directions as to tearing out the dams when it was necessary?

A. John Du Bois, when he was alive. Since he died we haven't torn out but two dams, and I gave those directions.

X Q. 62. Was not this dam torn out soon after Arthur Kirk commenced his suit on his dam patent, that is, the Chamber of Commerce dam? Yes or no.

A. Well, I don't know when Arthur Kirk commenced his suit. The dam was torn out while the dam above was being built.

X Q. 63. With regard to dam No. 8, on Narrows creek, is there any leakage between the transverse plank and the vertical
174 plank which projects beyond the rest of the vertical planks?

A. There would necessarily be a little leak there. It would not matter if there was a leak there; there would be no interference with the working.

X Q. 64. Is there any leak between the lowest transverse plank and the vertical planks in the lower end wall of the fore bay of dam No. 8?

A. There would necessarily be a leak there, but it would make no difference, because if the water was up to the height of the vertical planks it would raise the dam to its given height. That leak would close up in time with sediment and leaves so that it would not leak.

X Q. 65. How much leakage could there be now if the water were up to the board?

A. If you had a straight-edged board and laid it on there the leakage would be very small, very.

X Q. 66. When did you last see the water up to the transverse board and how much leakage was there then?

A. I have seen the dam full a number of times this spring, but we did not have the plank on. We don't need the plank only in low time of water. We don't put the plank on only when there is low time of water and we want to collect the water.

X Q. 67. Was the transverse planking there on the lower end wall of the fore bay on the 10th day of March, 1887?

A. I could not say whether there was or not.

X Q. 68. Can you say when it was put there?

A. I know we used to keep one there before we built the dam above it. Since we built that it has not been particular whether we had one on there or not.

X Q. 69. What is about the height of the transverse planking of the lower end wall of the fore bay of dam No. 8?

A. I can't say what is the height of it. I don't know whether there is any on there now or not. It might be one, two or three feet.

X Q. 70. What height do you keep this wall with regard to the full height of the leaves of the dam?

175 A. Whenever we want to save all the water we put it as high as the dam rises, or perhaps a little higher.

X Q. 71. How do these transverse planks fit in; do they fit in snugly and tightly. I mean dam No. 8?

A. Some of them do and some of them do not. I do not think they fit in very tightly on this dam. We don't save water there. We just merely raise the dam in floating dams to catch the pool and let it right off again.

X Q. 72. Would the planks then be just carelessly put in on top of the vertical planks?

A. If it was found necessary to put them on to raise the dams they would be.

X Q. 73. Then the only purpose of these transverse planks in the lower end wall of the fore bay of dam No. 8 is to keep the water in the fore bay at such a height as is necessary to raise the leaves of the dam to the height which you require?

A. When the water is higher than the vertical planks, we have to put these transverse planks on to make a head. As a general

thing we don't need them on that dam. It is only when the water is very high.

X Q. 74. When the water is low in the creek, do you use these transverse planks in dam No. 8, in order to make the height of the water in the fore bay sufficient to raise the leaves of the dam?

A. No, we don't.

X Q. 75. How then do you raise the leaves of the dam to the height which you require when the water is low?

A. Open the upper wicket and close the lower in the fore bay; then the dam will rise to its proper height, that is, in low-water time.

X Q. 76. In answer to cross-interrogatory 36 of your previous deposition in this case, you say that in some of the dams the water flows over the lower end wall of the sand washout flume, and in answer to interrogatory 11 of the present direct examination, you say that the heights of the lower end walls of the sand wash-
176 out flumes of the improved bear-trap dams on the Du Bois property are now above high-water mark. When was the change made in these walls?

A. This present season some time, this spring.

X Q. 77. Have they been nailed up since your previous deposition?

A. I could not say positively.

X Q. 78. Have they not been nailed up since you made your previous statement that the water flowed over the top of the ends walls of the sand washouts?

A. I could not say positively whether they have been or not, but I think they have been since. Anyhow I know they have been nailed up.

(The last two cross-interrogatories objected to and the answers, for the reason that the former interrogatory and answer on which they are based is incorrectly reported in the minutes.)

(Mr. Bakewall objects to the making of this objection as not competent for counsel to impeach a matter of record.)

X Q. 79. How do you know that they have been nailed up?

A. Because the creekmen wanted them nailed up and I gave them that permission.

X Q. 80. Have you been to look at them since they were nailed and when?

A. Yes, I have seen them all at different times. I could not say when. One I saw last Sunday, and one was a week ago today, last Friday.

X Q. 81. Can you remember when you first saw them after permission had been asked you?

A. No, sir, I cannot. They were nailed up when they began to run logs. I can't say when it was. I know it was this spring some time.

X Q. 82. Why were these boards nailed on tightly and not simply placed in guide-ways?

A. Because there was no need of there ever being removed.

177 X Q. 83. Why did the creekmen want them nailed up?

A. Because they wanted to save water there.

X Q. 84. What creekmen asked you for permission to nail them up?

A. All the creekmen on the creek wanted them nailed up. There was Irien Horn, he is head man of all these men.

X Q. 85. Did a man by the name of Mix want these boards nailed up?

A. I could not say whether he did or not. I presume he did do it.

X Q. 86. Did he ever speak to you about it or say that it would be necessary?

A. I could not say whether he did or not. The whole sum and substance of it was I wanted it done. They should have been built in the first place.

X Q. 87. Is Mix in a position to know whether the boards had been nailed on or not?

A. I could not say whether Mix knows or not; he ought to know. I could not say whether he goes up above those dams or not, or whether he works just about the mill.

X Q. 88. If he does work on dam No. 5, ought he to know it or not?

A. He ought to know whether there was water flowing over the end wall of fore bay or sand flume either.

X Q. 89. Then he ought to know whether boards had been recently nailed onto the lower end wall of the sand washout flume of dam No. 5?

A. Well, I really could not say whether he ought to know whether the boards were nailed on there or not; but he ought to know that the water was not flowing over there.

X Q. 90. In dam No. 8, on Narrows creek, how would you raise the gates of the dam to their full height if there was only low water in the creek?

A. Well, didn't I answer that before, that I would open the upper wicket and close the lower one.

X Q. 91. Would that be quite sufficient to raise the gesat
178 or leaves of the dam to their full height?

A. It would be sufficient as the pool raised. Of course the gates would only raise as the pool raised.

X Q. 92. What is necessary to be done in order to raise the pool to its full height in stages of low water?

A. Raise the gates, and that is done by shutting the lower wicket and opening the upper.

X Q. 93. In your answer to cross-interrogatory 90, you state in order to raise the gates of the dam it would be sufficient to open the upper wicket and close the lower one as the pool raised, will you explain what you mean by saying as it is sufficient as the pool raised?

(Objected to as not proper cross-examination on any matters asked in direct examination and as seemingly intended merely to consume time.)

A. Of course in these dams the dam rises as the pool rises. That is in low-water times.

X Q. 94. Would the water in the fore bay rise as the pool rises?

A. Yes, sir; it would seek its level until it got up to the top of the vertical plank.

X Q. 95. Then in order to raise the level of the water in the pool in stages of low water you would place the transvere planks in the end wall of the fore bay in their position above the vertical planks?

A. When water was above the vertical plank and I wanted to save the water, I would plank on crossways above; in dam No. 8 or any other dam.

X Q. 96. Question repeated, and an affirmative or negative answer is required.

A. If I wanted to raise the water or save the water, I would put those planks on above the vertical planks. If I didn't want to save the water, I wouldn't bother putting them on.

179 (Counsel for complainants repeats previous question and requests a simple affirmative or negative answer.)

(Objected to for the reason that the counsel for complainant has no right to badger the witness by repeating the same question three times, and has no right whatever to demand an affirmative or negative answer, witness having a right to answer the question in his own way.)

A. I answer just as I did before. On that question I can't answer yes or no.

X Q. 97. In order to raise the level of the water in the pool in stages of low water above the level of the vertical planks in the end wall of the fore bay, would you place tranverse planks above those vertical planks, I mean in dam No. 8?

A. Yes.

X Q. 98. When you were last at dam No. 8 did you work the wickets and raise the gates?

A. I did.

X Q. 99. Did you raise the gates to their full height?

A. No.

X Q. 100. How high did you raise them, and what was the height of the water in the pool?

A. The water in the pool was about two feet high, and the gates went up two and one-half feet more or three feet less.

X Q. 101. In building this dam No. 8 on Narrows creek, how would the vertical planks of the lower end walls of the fore bay be made of the proper height, would they be sawn across or chopped down?

A. Sometimes chopped and sometimes sawed, just as the chances might be.

X Q. 102. How was it done in case of this dam No. 8?

A. Could not say. It is off or partially off, and I don't know how it was done.

X Q. 103. Could you tell from the appearance of the planks whether they had been chopped off or sawed off?

180 A. Why most certainly.

X Q. 104. How was the lower end wall of the fore bay of dam No. 8 in Narrows creek originally built, with vertical or with transverse planks?

A. I think it was built with vertical, part way, just as all the others, up to the cross-beams at the top. Not as all of them, there were some of the first ones that were built crosswise all the way up.

X Q. 105. In chopping down the vertical planks of the lower end wall of the fore bay, would you chop down to this cross-beam or below it?

A. Just to it.

X Q. 106. Would you chop them down in this way in order to make them of substantially the same level with the cross-beam?

A. I would not chop them down under any consideration. I don't know whether any of them have been chopped down or not. If it were done, it would be to make them of substantially the same level with the cross-beam.

X Q. 107. Is not your occupation at Du Bois principally that of taking charge of the farming operations and of the stock?

A. That and all outside business, such as stocking the mills, driving the logs, building and repairing dams, furnishing supplies and most all necessary improvement.

X Q. 108. Do you get a fixed salary or do you get a share of the profits?

A. I get a fixed salary.

Redirect examination:

Q. 109. State whether or not in the fall of 1885, and in what month, if you recollect, Arthur Kirk, exhibited at the Brookville fair, a model showing his invention on the improved bear-trap dam, and if so what if any overflow or escape did that model show?

181 A. He showed an exhibit there in either September or October.

(Objected to by Mr. Bakewell, first, because it cannot be pretended that this question would lead to the proof of anything at all in answer to any of complainant's rebutting testimony, nor of anything which has been brought out in the present cross-examination, as well as for the reasons noted at the beginning of this deposition.)

(Answer continued. There was an opening near the peak of the dam on the side opposite from the wicket gate. That opening extended into a flume or passageway, and the water passed out from under the dam into a flume and into the creek below.)

Q. 110. Did that model show any other overflow opening than that one?

(Question objected to for the same reasons above and as leading.)

A. I saw no other.

(For the reasons stated above, Mr. Bakewell declines to recross-examine.)

C. F. FULLER.

WILLIAM MARTIN, a witness produced on behalf of defendant in surrebuttal, or rebuttal, being duly sworn deposes and says:

(Defendant offers this witness and proposes to examine him in surrebuttal, or in rebuttal of matters proved by the complainant in his testimony heretofore taken.)

Q. 1. State your name, age, residence and occupation.

A. William Martin; age, 40 years; residence, Bellevue, Pa.; occupation, civil engineer.

Q. 2. State, if you please, what experience you have had
182 as an engineer in connection with dams and river navigation and also generally?

A. I was assistant city engineer of Pittsburgh from 1868 to 1877. Since that at Davis Island dam.

Q. 3. Exhibit Complainant's Patent No. 268,411, shown to witness, and he is asked to read and examine the sixth claim and also the description contained in the specification on page 2, commencing with line 109 and extending to line 3, on page 3, which is as follows:

"6. A bear-trap dam having a relieving or open sluice extending from under the gates, so as to relieve them from unnecessary pressure, substantially as, and for the purposes described."

"In the end wall of the dam I make an open sluice, water-way or tail race (38), figure 2, at such height as will permit all water which is not required to sustain the gates, to escape from under them. When the gates are down, as in the position shown in figure 1, the water is admitted by the wickets under them. This raises and floats them up until they reach the position shown by figure 2. By that time the water having reached the sluice (38), which passes through the wall around the end of the gates, will flow freely through, sustaining the gates at that level.

"A modified construction of the sluice (38) is shown by figure 4 where the outlet (39) in the wall is below the level of the water, the latter passing through the outlet (39) into a fore bay or well (40), and thence over the bridge (41).

"If desired, the discharge opening may be controlled by a valve operated by a float.

"It is apparent that the form, place and details of construction of the sluice for relieving the gates from excessive pressure below can be carried by the skilled constructor; but in all cases an open channel will be necessary when the water has reached a certain height or pressure under the gates."

Taken in connection with the rest of the letters patent and the drawings thereto attached, what definite construction, in your opinion, is described and claimed in said letters patent?

A. It does not describe any definite construction. It does
183 not make any difference whether the outlet hole is above or

below. The discharge race must be at the height to which the gates are to be raised.

Q. 4. Where do you understand the discharge hole to be and where do you understand the outlet to begin?

A. It is below the crest of the dam and at the point of the height of maximum pressure. The object of this sluice is to prevent too much pressure from the headwater on the structure. The idea of it is to admit enough pressure to raise the dam to the required height.

Q. 5. When you speak of the point of maximum pressure, whereabouts is that maximum pressure located, as described in language quoted?

(Mr. Bakewell objects to this question and the previous question, because the deposition is taken out of time, and because, in any case, it is not competent at this stage of the cause.)

A. It might be anywhere, it depends upon how high they wish to raise the dam. The main idea of this sluice is to stop the pressure on the dam when the gate is at its full height.

Q. 6. Where does this sluice begin?

A. According to this drawing it is shown at two points, one near the crest of the dam and one near the bottom of it, numbered by this drawing (38) and (39).

Q. 7. Where does this sluice end as shown by the patent?

(Objection continued.)

A. It ends as represented by this drawing at (38) and (41).

Q. 8. What is the definite character of this sluice, is it a tail race or a fore bay?

(Objection continued.)

A. I wouldn't call it either. I would call it a waste weir.

184 Q. 9. What is the function and character of a waste weir?

(Objection continued.)

A. It is to carry off the surplus water.

(Mr. Bakewell denies the competency or relevancy of this deposition and declines to cross-examine.)

WILLIAM MARTIN.

PITTSBURGH, *July* 1*st*, 1887.

JAMES H. HARLOW, a witness called on behalf of defendant in surrebuttal or rebuttal, being duly sworn, deposes and says:

Q. 1. State your name, age, residence and occupation.

A. James H. Harlow; age, 40 years; residence, Allegheny City; occupation, civil engineer.

(Defendant offers this witness and proposes to examine him in surrebuttal, or in rebuttal, of matters proved by the complainant in his testimony heretofore taken.)

Q. 2. State, if you please, what experience you have had as an engineer in connection with dams and river navigation, and also generally?

A. Since 1865. In 1865, 1866 and 1867 I was with the Franklin Company, Lewiston, Maine, for the construction of stone dams for manufacturing purposes. In 1869 I was at Rock Island arsenal, Mississippi, in the construction of stone dams. In 1876 and 1878, stone dam for the additional supply of water to Boston, and in 1878 to 1880 I was assistant to Lieutenant Mahan, at Davis Island dam, and from 1881 to 1884, in charge of the Monongahela River improvements, that is, the Monongahela Navigation Company's part of it. The balance of the time in the construction of water works at various places.

Q. 3. Exhibit Complainant's Patent, No. 268,411, shown
185 to witness, and he is asked to read and examine the sixth claim on, and also the description contained in the specification on page 2, commencing with line 109 and extending to line 3, on page 3, which is as follows:

"6. A bear-trap dam having a relieving or open sluice extending from under the gates so as to relieve them from unnecessary pressure, substantially as and for the purposes described."

"In the end wall of the dam I make an open sluice, water-way, or tail race (38) figure 2 at such height as will permit all water which is not required to sustain the gates to escape from under them. When the gates are down, as in the position shown in figure 1, the water is admitted by the wickets under them. This raises and floats them up until they reach the position shown by figure 2. By that time, the water having reached the sluice (38) which passes through the wall around the end of the gate, will flow freely through, sustaining the gates at that level.

"A modified construction of the sluice (38) is shown by figure 4, where the outlet (39) in the wall is below the level of the water, the latter passing through the outlet (39) into a fore bay or well (40), and thence over the bridge (41).

"If desired, the discharge opening may be controlled by a valve operated by a float.

"It is apparent that the form, place and details of construction of the sluice for relieving the gates from excessive pressure below can be varied by the skilled constructor; but in all cases an open channel will be necessary when the water has reached a certain height or pressure under the gates."

Taken in connection with the rest of the letters patent, what definite construction, in your opinion, is described and claimed in letters patent; what kind of a tail race or a fore bay?

(This question and the other questions objected to as being taken out of the time allowed by the order of court and as being irrelevant and incompetent at this stage of the cause.)

A. Of the two, I should think it is a tail race.

186 Q. 4. Where does such sluice, or tail race, begin, and where does it end as described?

(Objection continued.)

A. I don't know, because there is nothing here to show.

Q. 5. What is the outlet (38) and (39) in connection with said sluice?

(Objection continued.)

A. I should say it is immaterial where figure (38) shown inside the dam is placed, providing it connected with the water above the dam, but that number (38) shown outside the raised dam must be placed at a height that will allow the surplus water to escape after having performed its work.

Q. 6. According to that description where is (38) in the end wall of the dam with regard to the chamber under the dam?

(Objection continued.)

A. In figure 2 it is shown at the same elevation as number (38) outside of the dam.

Q. 7. From what part of the dam does the first figure (38) open?

(Objection continued.)

A. I should think it opened from the end wall of the dam just below the leaves of the dam when raised.

Q. 8. State where the water which passes through (38) is located with regard to the leaves of the dam before it flows through (38).

(Objection continued.)

A. Underneath.

187 Q. 9. Where is the discharge opening (38) situated with regard to the dam and the stream below the dam?

(Objection continued.)

A. It's outside of and below the lower leaf, and placed at an elevation to which it is necessary to carry the water to just raise the dam.

Q. 10. State in figure 4, modified construction of sluice (38), what portion of sluice (38) outlet (39) corresponds to?

(Objection continued.)

A. It represents the same as No. 38 inside the dam shown on figure 2, and as stated in a previous question, it is immaterial as to its height provided it is connected with the water above the dam.

Q. 11. Where is the water situated with regard to the dam, before it flows through outlet (39)?

(Objection continued.)

A. Underneath the dam.

Q. 12. State in figure 4, modified construction of sluice (38), to what portion of sluice (38) does bridge or discharge opening (41) correspond?

(Objection continued.)

A. Same as 38 figure 2 outside of the dam, and to answer the same purpose, the same height.

Q. 13. To what portion of sluice (38) in the modified construction of the sluice (38), shown in figure 4, does the fore bay or well (40) correspond?

(Objection continued.)

188 A. To the connecting channel between (38) and (38) shown in dotted lines in figure 2.

Q. 14. State whether or not the sluice water-way or tail race shown in figure 4 is equivalent substantially to the open sluice water-way or tail race shown in figure 38 of figure 2.

(Objection continued.)

A. I think they are intended to represent substantially the same idea.

(For the reasons noted above, complainant's counsel declines to cross-examine.)

Q. 15. According to the wording of said patent shown to you, to what part of the dam is the water from above the dam admitted before it flows into or connects with outlet (38) or (39), as indicated in your answer to interrogatory 5?

(Objection continued.)

A. It is admitted by wickets underneath the dam not shown in the cut. I wish to correct answer to interrogatory 5, where it states "connected with the water above the dam," to read "connecting with the water underneath the leaves of the dam."

(Mr. Bakewell requests the witness to give his answer to interrogatory 5, as amended in full.)

(Witness states: "It is immaterial where figure 38, shown inside the dam, is placed, providing it connected with the water underneath the leaves of the dam, but that number (38) shown outside the raised dam must be placed at a height that will allow the surplus water not to escape after having performed its work."

189 (Mr. Patterson calls witness' attention to his answer to interrogatory 10, and asks him what correction he has to make in view of his subsequent answers.)

(Witness states: My answer should be: "It represents the same as No. 38 inside the dam, shown in figure 2, and as stated in a previous question, it is immaterial as to its height, provided it is connected with the water underneath the leaves of the dam.")

JAMES H. HARLOW.

(T. H. B. Patterson, attorney for the defense, here gives notice that on account of the objection made by Mr. Bakewell, the complainant's attorney, that the testimony taken this day of witnesses William Martin and James H. Harlaw is not taken in time, although he himself suggested the adjournment of taking of testimony from yesterday and has not been present most, if not all, the time during the taking of said depositions, he will move the court tomorrow morning for an extension of time so as to include the said depositions already taken, if the court shall be of opinion that under the circumstances they are not taken in time, or that the question of time has not been raised—waived by the appearance of complainant's attorney to make objections during the taking of said depositions. Said motion will be made tomorrow morning at 10 o'clock or as soon thereafter as counsel can be heard.)

190 *Testimony in Rebuttal.*

PITTSBURGH, *April* 12, 1887.

Met pursuant to agreement of counsel.

Present: Thomas W. Bakewell, Esq., on behalf of complainant, and T. H. Baird Patterson, Esq., on behalf of defendant.

B. F. RYND, a witness called on behalf of complainant in rebuttal, being duly sworn, deposes and says as follows:

Int. 1. State your age, residence and occupation.

Ans. I am forty-nine years old; residence, Allegheny city, Pa.; occupation, lumber business.

Int. 2. Have you ever visited Du Bois, Clearfield county, Pennsylvania, and if so, when, and under what circumstances?

Ans. I have been there several times. I was in a party that went up the 24th day of December, 1879.

Int. 3. In whose company did you visit Du Bois at that time?

Ans. There was quite a large company, composed of citizens of Pittsburgh and Allegheny city and the surrounding country, among whom were Col. Schoonmaker, James Park, Jr., Capt. Mahan, John F. Dravo, Capt. Wood, the riverman, Col. Harry White, congressman, a gentleman by the name of Osbourne, who was a member of Congress, Sidney Fuller, T. J. Bigham, a man by the name of Speer, and Arthur Kirk.

Int. 4. At whose instance did you visit Du Bois?

Ans. Mr. James Stedeford and I went to represent Allegheny councils. I can't say who gave the excursion, but I suppose it was at the invitation of Mr. Du Bois. Mr. Kirk was very active in getting the excursion up.

191 Int. 5. What did you do when you reached Du Bois?

Ans. We got our meals first, and then got a sleigh, and went to the dam. There were a half dozen sleighs. The dam we went to see was about a mile and a half or two miles from Mr. Du Bois' house.

Int. 6. What kind of a dam was it?

Ans. It was a movable dam with rising leaves. It was Du Bois' improved dam, what Capt. Mahan called a bear-trap dam.

Int. 7. Look at the model which I show you, and state whether or not it represents the style of dam which you then saw?

(Witness shown "Defendant's Exhibit Model.")

Ans. It represents the dam in every respect, except the sand wash-out wasn't there. The leaves were up, and the dam was full of water, and the water ran over the upper leaf. There were four inches of ice that hadn't been broken away; it was all solid above and below, that is the ice.

Int. 8. What was the height of the lower end wall of the fore bay as compared with the height of the upper end wall?

Ans. My recollection of the fore bay is that it was full of water. I don't recollect of a single drop of water running over that end, the water was running over the dam.

Int. 9. Then what was the height of the lower end wall of the fore bay as compared with the level of the water in the fore bay?

Ans. I believe the end walls of the fore bay were higher than the water. I don't recollect particularly about the upper one, but I know the lower one was higher than the level of the water, because the water was not flowing over it.

Int. 10. State whether or not the dam was then raised and lowered in your presence.

192 Ans. Yes, sir. Col. Harry White acted as engineer, he took hold of the valve and let the dam down and raised the dam several times.

Int. 11. State whether or not the dam was raised to its full height?

Ans. I believe it was raised high enough so that the water would not run over it. It was used to break the ice. I don't believe it was raised to its full height.

Int. 12. How was it when you first went there?

Ans. The water was running over the dam, and the fore bay was full of water pretty near up to the top of the walls at the side.

Int. 13. What was Mr. Du Bois' object in having you and these other gentlemen visit his dam?

(Objected to as incompetent, as not being proper for the witness to testify as to what the object of Mr. Du Bois was unless Mr. Du Bois personally stated to him his entire object in the presence of Arthur Kirk, the complainant in this case.)

Ans. The understood object was to explain the merits of his dam. He wished to introduce it in the Ohio river, and also in the Allegheny river, and have it adopted by the Government. That was before the Davis Island dam was built, but they were talking about building it.

Int. 14. State whether or not Mr. Du Bois, at your visit there, did explain to you the merits and good points of his dam?

(Objected to as incompetent and irrelevant, unless the witness first testifies that Mr. Du Bois stated that the merits and good

points, to which he called attention, were all the merits, good points, and inventions or discoveries that he then claimed, or upon which he was experimenting.)

Ans. He did, and practically showed us some of the good points of his dam, and we were all pleased with what we saw, and believed that if we had had the casting vote we would have voted for that dam for the Davis Island dam.

193 Int. 15. State whether or not you heard of any idea of controlling the water pressure on the dam leaves by means of reducing the fore-bay wall so that the water would run over the wall when the dam reached the desired elevation?

(Objected to as incompetent and irrelevant, and not proper rebuttal, and being an attempt to prove a negative.)

Ans. I don't think I heard any remark about that. I don't think that matter was brought up. It was not brought up in my presence, but it might have been talked of elsewhere.

Int. 16. Why do you make that statement, "it might have been elsewhere"?

Ans. The question before that was asked if I had heard any remark about regulating the water, and I stated that I had heard nothing in my presence, but those remarks might have been made elsewhere. I was around with the company.

Int. 17. How long did you remain at Du Bois?

Ans. I believe I remained 24 hours after the rest of the party had gone away. Mr. Stedeford and myself.

Int. 18. In whose company did you remain?

Ans. John Du Bois.

Int. 19. State whether or not you personally examined the fore-bay walls of the dam?

Ans. I can't say that I personally examined them. I didn't apprehend the question. I was over and around and below the dam, the fore bay.

Int. 20. State whether or not you examined the fore-bay walls; I use "examine" in the sense of looking at or observing?

Ans. I examined by, you might say, general observation; I didn't go into any details.

Int. 21. What did you do on the second day of your visit to Du Bois?

194 Ans. I was in company with Mr. Stedeford and Mr. John Du Bois, and Sidney Fuller. We examined Mr. Du Bois' mills, and I did personally go up and examine the dam myself again. It was bitter cold, and not much to be seen. I went just by myself.

Int. 22. At the time of this visit to Du Bois, state whether or not Mr. Kirk was in Du Bois' employ as far as you know.

Ans. I don't know of him being in John Du Bois' employ, although he took a great deal of interest in the matter.

Int. 23. Are you in any way interested in the result of this suit?

Ans. No, sir.

Cross-examination:

X Int. 24. How long have you known Arthur Kirk, complainant in this case?

Ans. Ten or twelve years. Three or four years before we went to visit that dam.

X Int. 25. Was Mr. Kirk a friend of yours, or in any way associated with you?

Ans. No, sir.

X Int. 26. Then in getting you to go upon this excursion, he was acting entirely for Mr. Du Bois?

Ans. I believe it was through his influence, that is, at John Du Bois' request.

X Int. 27. Who was actively representing Mr. John Du Bois in getting the excursion to go up there?

Ans. I think two very active men were yourself and Mr. Kirk.

X Int. 28. Did you ever see me in connection with the excursion, except at the depot when I furnished the tickets?

Ans. I believe that is all I recollect of having anything to do with you, only at the depot.

X Int. 29. Then as far as you know, Mr. Kirk was more active in the matter than I was?

195 Ans. I can't say positively about that. He seemed to take great interest in the matter. I can't say which one of you handed the tickets, but I believe you both stood there when we came into the depot, stood at the window. I can't say who got the party up, but it was for John Du Bois' interest that the party was gotten up.

X Int. 30. Did you know any other person more active in getting up this excursion, and in managing and talking during this excursion than Arthur Kirk?

Ans. There was one other man talked about as much as Arthur Kirk, Sidney Fuller, and they are the two that did the most talking in the city here.

X Int. 31. About the time of this excursion to Du Bois did you get the impression from Arthur Kirk or others, that Arthur Kirk was directly interested in getting the Du Bois dam introduced at Davis island or elsewhere?

Ans. No, I didn't get that impression from Arthur Kirk, nor from others. I didn't know that he had any interest in the dam.

X Int. 32. How did Arthur Kirk's activity and exertions with regard to this excursion and in interesting the public in this dam, impress you?

(Objected to as incompetent and irrelevant.)

Ans. My idea was that he was anxious to have a dam in the Allegheny river, and this being the most practicable and cheapest dam then known, that he was making every exertion that way to have it adopted. In that way I account for his taking so much interest in the matter.

X Int. 33. Wasn't it very unusual for a man whose business was not connected with the river to take such an active interest in an

improved dam, as Mr. Kirk did, unless he had some personal reason for so doing?

(Objected to as incompetent, the witness not being offered as an expert in human motives of conduct.)

Ans. Men that are in the dry-goods business would not
196 take much interest in steamboating, but that ought not to reflect on Mr. Kirk.

X Int. 34. Prior to your visit to Du Bois at this time, had the winter been pretty severe?

Ans. No, sir; only within two or three days very severe.

X Int. 35. When you got up to Du Bois, was the ground covered with snow, and if so, to what depth?

Ans. When we took the train at Pittsburgh there was no snow here, but when we arrived at Du Bois there were four or five inches of snow, enough for sleighing.

X Int. 36. When the excursion was at Du Bois, was it very cold weather the whole time you were there?

Ans. It was very cold. There were four inches of ice in the creeks.

X Int. 37. Do you remember whether the ground was frozen very hard?

Ans. The ground was not frozen to any depth; it was frozen hard on the surface.

X Int. 38. Do you remember whether we took dinner when we got to Du Bois, or whether we didn't take it on the road, and what time of the day we got there?

Ans. We took our dinner on the way. I said in my former testimony that we got our dinner when we got there, but I was mistaken in that. We got our dinners on the way.

X Int. 39. Do you remember when we went down to the creek whether the creek was high or low?

Ans. I think the water was within eighteen inches of the top of the banks of the creek. It may have been less.

X Int. 40. Do you remember whether the ice was dished in the creek?

Ans. I think not, but I wouldn't say positively.

X Int. 41. Had you ever been at Du Bois or at the creek there before that visit?

197 Ans. I had been at John Du Bois' mills and store, but never at the creek.

X Int. 42. Then you don't know whether or not, when the water is up in the creek, the bottom land in the neighborhood you were visiting was swamp land or not, do you?

Ans. The land on the right of the creek facing down was very low flat land.

X Int. 43. This excursion that you speak of had been spoken of in the papers and was made public, and the proceedings and all that occurred there at the dam was made public by publication in the papers, was it not?

Ans. Yes, sir; immediately afterwards.

X Int. 44. Then the whole excursion was of a very public character, was it not?

Ans. Yes, sir.

X Int. 45. When at Du Bois, you only visited one dam?

Ans. That's all.

X Int. 46. Do you know whether there were any others there at that time to your knowledge?

Ans. I heard John Du Bois and Sidney Fuller both speak of other dams being in the neighborhood. One or two more at least.

X Int. 47. Everything that you have mentioned with regard to this dam was pointed out or spoken of publicly in the presence of the whole party, was it not?

Ans. I believe all remarks were made general.

X Int. 48. The whole exhibition of the dam was a public exhibition?

Ans. Yes, sir.

X Int. 49. After this exhibition at the dam, the excursion adjourned to the house of Mr. John Du Bois, didn't it; and there had a big supper and organized and elected officers, and passed resolutions and prepared minutes which were telegraphed to the city papers and published the next day?

198 Ans. To all of that I say yes.

Redirect examination:

Int. 50. State whether or not the dam we have been speaking of had an apron attached to the top edge of the upper leaf.

(Objected to as incompetent and irrelevant, and not rebutting testimony as to anything proved by the defendant, and if proper at all would only be competent in chief.)

Ans. I can't say that I am clear on that subject, but I am under the impression there was a half apron.

Int. 51. State whether or not Mr. John Du Bois was with you when you examined the dam on the first day?

Ans. Yes, sir.

B. F. RYND.

PITTSBURGH, *April* 19, 1887.

Met pursuant to notice hereto annexed.

Present: Thomas W. Bakewell, Esq., for complainant.

R. N. SPOHN, being duly sworn, deposes and says in answer to interrogatories propounded by Mr. BAKEWELL:

Int. 1. State your name, age, residence and occupation.

Ans. R. N. Spohn; age, 39 years; residence, Pittsburgh, Pa.; occupation, clerk, at the P. C. & St. L. R. R. freight station.

Int. 2. State whether or not you have ever been engaged in the exhibition of model dams, and if so, when, where, and for whom?

Ans. I have, at the Pittsburgh exposition, September and October, 1880, for John Du Bois.

Int. 3. What kind of dams did you exhibit?

Ans. The bear-trap dam. I had a working model of the dam there.

Int. 4. How many leaves had this dam?

199 Ans. Three. The one leaf underneath appeared to be worked independently of the two above. It was fastened to the lower side and raised, while the other two were hinged together at the centre.

Int. 5. What was the height of the fore-bay walls in this dam?

Ans. Same as the top of the dam. All of them were the same height.

Int. 6. At what height did the water in the fore bay stand?

Ans. The water in the fore bay was the same height as the water above the dam.

Int. 7. State whether or not you had any conversations with Mr. Du Bois about this dam, and if so, whether or not he explained to you any overflow device through which the water in the fore bay would run when it reached a fixed height?

Ans. He never explained anything of that kind to me. The first time that Mr. Du Bois came to see me while I was exhibiting, he listened to me explaining the dam and all its workings, and then said I knew the whole dam business as well as he did. We had many conversations together. I helped him to take the dam apart and repair it.

Int. 8. State whether or not Mr. John Du Bois explained to you the purpose of the third leaf, and if so, what was it?

Ans. He did. The third leaf he said was to be used as a tail for carrying the debris over the dam. Another purpose was to keep the lower leaf from rising clear out of its place.

Int. 9. In whose employ were you when you exhibited this model?

Ans. Mr. John Du Bois.

All the foregoing testimony is objected to for the following reasons, which are here inserted after the testimony has been taken down, by previous agreement. All of the foregoing testi-

200 mony is objected to as incompetent and irrelevant, as not rebutting anything proved by the defendant in this cause, there having been no testimony offered in any way relating to or connected with the model dam testified to by the witness, and for the further reason that without even a pretence of any confidential relations with John Du Bois, who is not the defendant in this case, and without even pretending that John Du Bois disclosed to him all his inventions and ideas in connection with his improvements on the Du Bois dam, the witness undertakes to testify on the theory that he knows as much about Mr. Du Bois' intentions and claims as Mr. Du Bois did. Also for the reason that the whole testimony is a mere attempt to prove an inferential negative, and this too by a witness who was only employed for a limited time to exhibit a model showing those accomplished and patented inventions, which John Du Bois thought proper to make public at the time said model was exhibited.

Cross-examination by Mr. PATTERSON, subject to the foregoing objections:

X Int. 10. How long were you in Mr. John Du Bois' employ?

Ans. About five weeks, during the exposition.

X Int. 11. Did you ever have any acquaintance with Mr. John Du Bois, or do any work for him since that time?

Ans. No.

X Int. 12. Was Mr. John Du Bois an entire stranger to you, and did he make a confidant of you any further than to instruct you what to do in exhibiting that model?

Ans. Only in exhibiting and repairing of that model, so that in case of an accident of any kind I could repair it up myself.

X Int. 13. Then outside of that model, have you any knowledge of the Du Bois improved dam?

Ans. I have no further knowledge than what he explained to me there that that was a correct working model of his dam.

201 X Int. 14. You mean of his dam as he then exhibited it at the Pittsburgh exposition, which was a public occasion, was it not?

Ans. That was all. Of course it was a public occasion.

X Int. 15. How was the water arranged for the purpose of operating that model as exhibited?

Ans. There was a sluice way along the side of the dam, the fore bay, with a gate at each end. We had a city connection of three-inch pipe that ran into a tank, and we ran the water from the tank down. The dam sat in the tank, but the water below the dam was carried away by a waste pipe which kept the level of the water down to the level of the floor of the dam.

X Int. 16. How long have you known Arthur Kirk, complainant in this case?

Ans. Since about 1872.

X Int. 17. Is he a friend of yours?

Ans. I would consider him such.

X Int. 18. Was he in any way connected with the exhibition of the Du Bois dam, and did he take any interest in the exhibition of it?

A. I don't think that he appeared any more interested in that at that time than he did in the general improvement of the Allegheny river.

X Int. 19. When Mr. Du Bois' dam was on exhibition there, did he show any preference for it?

Ans. He said he thought it was the best working model there exhibited.

X Int. 20. Did he talk to you about it, and call the attention of people to it specially during the exhibition?

Ans. Well, he came around there. I can't say that he called attention to it more than he did to the other dams there working at the same time.

X Int. 21. Was he there while the dam was on exhibition when Mr. John Du Bois was there?

Ans. He was, they were both there together. If I am not mistaken, they came to see me together.

202 X Int. 22. Do you recollect ever hearing Arthur Kirk praising the Du Bois dam to Mr. John Du Bois while he was there?

Ans. I don't remember ever hearing him praising it just to Mr. Du Bois himself.

X Int. 23. Have you any recollection of hearing him call Mr. John Du Bois' attention to any defects in the model at the time it was on exhibition?

Ans. I don't think I did.

X Int. 24. When was your attention first called to the height of the fore-bay walls or sluice walls in this model which was on exhibition in your charge, and by whom?

Ans. It wasn't necessary to call my attention by any one. I had it there before me and could see for myself.

X Int. 25. Who first spoke to you about what the height of those walls was, and when?

Ans. The way that I remember about the walls being the same height—(Objected to.) When I was exhibiting the dam, Mr. Du Bois explained to me that these walls were to be the same height as the water above.

X Int. 26. Did anybody else speak to you about the height of these walls up to this time?

Ans. Up to this time I have been asked about the escape or relieve ways.

(Witness says that he intended to say that he had been asked as to whether there were any escape or relieve ways.)

X Int. 27. Who first spoke to you about it?

Ans. Mr. Bakewell.

X Int. 28. Did any one speak to you about the relieve ways on this model before Mr. Bakewell spoke to you about them here today before you were examined, and when?

Ans. Some time ago Mr. Kirk came to me and asked me if I remembered of any relieve way or anything of that kind. I told him there was not.

X Int. 29. About how long ago was this?

203 Ans. It was just before I made my first affidavit in the case of Arthur Kirk *vs.* John Du Bois.

X Int. 30. Then, from the time that the model was exhibited at the exposition up to that conversation, had anybody mentioned anything to you with regard to the relieve way of the model that you have been testifying about?

Ans. I think not.

X Int. 31. The walls that Mr. Du Bois was talking about were the walls on the model, were they not?

Ans. The walls were, as I understood him at the time, all the same.

X Int. 32. Do you recollect whether or not Mr. Arthur Kirk at the time this model was on exhibition, made any claims there that

he had a patent dam that was superior to that of Mr. John Du Bois'?

Ans. I don't remember of hearing anything of that kind.

X Int. 33. Did Mr. Kirk at that time when there with Mr. John Du Bois, make any claim that he had invented a superior mode of regulating the escape of the water from under the dam, and relieving the pressure under the dam leaves? I mean at the time this model was on exhibition at the Pittsburgh exposition.

Ans. I don't remember hearing anything of that kind.

X Int. 34. Was there any reference made to or discussion of the relief of pressure of the water on the leaves of this model by Arthur Kirk or any one else at that time, that you remember of?

Ans. I have a remembrance of Mr. Kirk saying it could be arranged that the water could relieve itself; that is in regard to the working of this model.

X Int. 35. Did Arthur Kirk recommend you to Mr. John Du Bois, or have any connection with your employment for the purpose of exhibiting this model at the exposition?

204 Ans. Mr. Kirk recommended me for the position.

R. N. SPOHN.

Adjourned to Friday, April 22, 1887, at 10 o'clock a. m.

PITTSBURGH, *April* 22, 1887.

Met pursuant to adjournment.

Present: T. W. Bakewell, Esq., for complainant, and T. H. Baird Patterson, Esq., for defendant.

N. G. AYRES, a witness produced on behalf of complainant in rebuttal, being duly sworn, saith:

Int. 1. State your name, age, residence and occupation.

Ans. N. G. Ayres; age, 39 years; residence, Sharpsburg, Pa.; occupation, by profession I am an attorney.

Int. 2. Are you acquainted with Arthur Kirk, one of the parties to this suit?

Ans. I am.

Int. 3. Has Mr. Kirk ever spoken to you with reference to an improvement in bear-trap dams?

Ans. Yes; he spoke to me quite frequently on the subject.

Int. 4. State when, and under what circumstances, and what did he say?

(Objected to as incompetent and irrelevant, and not rebuttal of anything in the defendant's case, and for the further reason that the testimony of Arthur Kirk, the complainant, being incompetent in this cause, any testimony as to what he said or stated to the witness, unless in the presence of the defendant, would also be incompetent.)

Ans. Mr. Kirk spoke to me on the subject of improvement in dams as early as the year 1879. In January, 1880, I prepared a caveat for him setting forth the nature of the improvement made by him.

205 Int. 5. What was Mr. Kirk's invention, as he explained it to you in January, 1880?

(Same objection continued.)

Ans. His invention consisted in a plan to remove surplus water from the dam, and to relieve the dam of pressure.

Int. 6. How did Mr. Kirk propose to remove the surplus water?

(Same objection continued, and also for the further reason that Mr. Kirk's invention and plan for removing the surplus water from under the leaves or gates of the dam having been stated in his written application, and in his testimony under oath, and in the figures and language of his patent already in evidence in this case, it is not competent to adduce oral testimony as to the same.)

Ans. Mr. Kirk proposed removing the water at the time I prepared the caveat for him by means of an opening or openings in the walls of the dam. He told me at the time there were other ways he was thinking of, but was desiring further time to perfect and complete his ideas. He had a system of valves in connection with the openings which I don't recollect much about.

Int. 7. Look at the document which I now show you and state if you know what it is, and when it was written.

(Objected to for all the reasons set forth in the last two preceeding objections, and also for the further reason that the paper shown witness has never been completed and executed by any person, and being therefore simply a blank form is incompetent for any purpose whatever as evidence or testimony.)

Ans. This is a paper prepared by me in January, 1880, for Arthur Kirk, at his request to be used as a caveat, and intended to be a caveat. The specifications contained in the paper were furnished to me by Mr. Arthur Kirk. I prepared the paper and gave it to Mr. Kirk.

Int. 8. In whose handwriting is the paper?

(Same objections continued.)

206 Ans. It is in my handwriting, and is the paper prepared by me in January, 1880, and given to Arthur Kirk.

(The paper referred to by witness is offered in evidence, and marked "Complainant's Exhibit Kirk Caveat.")

(Objected to for the reason that the said paper shows upon its face that it is a mere unexecuted memorandum in writing; and for the further reason that if it was ever used as a caveat, it would be upon file in the Patent Office of the United States, and such paper as is now attempted to be offered in evidence is therefore incompetent for any purpose. For the further reason that the condition of said written memorandum is an indication that its use was abandoned for the purpose for which it seems to have been drawn. Also for the reason that its offer is a covert attempt to get in evidence statements, claimed to be those of the complainant, which would not be competent as testimony if offered under oath

by the complainant in this case; and also for the reasons stated in the former objections to this witness' testimony.)

Cross-examination:

X Int. 9. What relation are you to the complainant in this case?

Ans. I am no relation. He is my father-in-law.

X Int. 10. State whether or not you have been engaged in business together for a number of years.

Ans. He was managing the powder business for me, I think, about three years.

X Int. 11. At the time he was managing the powder business for you, what was your business?

Ans. I was practicing law.

X Int. 12. When did this double business relation of the complainant and yourself begin, and when did it end?

Ans. I can only answer this question like the Yankee by asking another one. What double business relation do you refer to?

X Int. 13. I mean, when did you go into the powder business in addition to practicing law, and when your relation with Arthur Kirk, as the manager of your powder business, terminated?

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Ans. To the best of my recollection I became concerned in the powder business about April, 1879, and it has terminated now some four or five years. I don't recall exactly. I think I was agent for the powder company about three years.

X Int. 14. During that time, who actively conducted the powder business, yourself or Arthur Kirk?

Ans. Arthur Kirk and his son actively conducted the business. During the mornings and evenings I overlooked what had been done and made out the reports to the company I represented, signed the checks and matters of that sort.

— Int. 15. What company did you represent, and who preceded you as its agent, and who succeeded you as its agent?

(This line of testimony is objected to as being very irrelevant.)

Ans. I represented the Austin Powder Company, of Cleveland, Ohio. I had no predecessor. My successors are Arthur Kirk & Son.

X Int. 16. You testified in this matter as a witness in the interference proceedings in the Patent Office between Arthur Kirk and John Du Bois on the 30th day of November, 1881?

Ans. I testified as a witness; the exact date I don't recall. It was in that matter you refer to.

X Int. 17. Have you looked over that testimony since that date?

Ans. Yes, sir. I looked over it this morning in this office.

X Int. 18. Before your testimony now given?

Ans. Yes, sir.

X Int. 19. Can you state the earliest date at which Arthur Kirk, the complainant, mentioned to you his so-called in-

208

vention for carrying off the surplus water from under the dam leaves?

Ans. It was some considerable time before I prepared the caveat for him. The exact time I don't recollect.

X Int. 20. State as precisely as you can the date at which you claim that you prepared the so-called caveat memorandum.

(The use of the word "memorandum" is objected to.)

Ans. I cannot fix the day. I know it was some time during January, 1880, that I prepared the paper. I may say that I have not seen that paper from the time it was prepared until it was handed to me in this office this morning for identification.

X Int. 21. Then the paper that you testified to on the 30th day of November, 1881, as being a correct copy of this paper was not this paper or memorandum?

Ans. To the best of my knowledge the paper offered at the time referred to by Mr. Patterson was a copy of the caveat prepared by me, but in the handwriting of Arthur Kirk.

X Int. 22. Were these two papers compared by you at any time?

(Objected to as incompetent, and immaterial.)

Ans. I am fully satisfied they were. From the best of my recollection the paper referred to was a paper prepared by Mr. Kirk and from which I prepared this caveat.

X Int. 23. Then I understand you to state that this paper now testified to is a copy made by you from an original paper prepared by Arthur Kirk?

Ans. Yes, in substance. Mr. Kirk had spoken to me about his improvement in dams, and desired me to prepare a caveat, and believing that he could better describe his invention than I could, I asked him to prepare specifications, but this paper which has been offered in evidence was intended to be the paper to be used as a caveat.

209 X Int. 24. State whether or not, independently of this paper and of your former testimony on the interference hearing, you have any distinct recollection that this so-called caveat memorandum was prepared in January, 1880.

Ans. Yes; I know that it was prepared about that time from my own recollection and knowledge of the matter.

N. G. AYRES.

PITTSBURGH, PA., *April* 23, 1887.

Met pursuant to adjournment.

Present: T. W. Bakewell, Esq., for complainant, and T. H. B. Patterson, Esq., for defendant.

DAVID M. KIRK, a witness produced on behalf of complainant in rebuttal, being duly sworn, deposes and says:

Int. 1. State your name, age, residence, and occupation.

Ans. David M. Kirk; age, 26 years; residence, Sharpsburg, Pa.; occupation, dealer in powder.

Int. 2. Are you related to Mr. Arthur Kirk, complainant in this case, and if so, how?

Ans. Yes, sir; I am his son.

Int. 3. Are you acquainted with the general construction of bear-trap dams?

(Objected to as incompetent and irrelevant, and not tending to rebut anything in defendant's case.)

Ans. Yes, sir.

Int. 4. State whether or not you have ever heard Mr. Arthur Kirk mention an improvement of his to be applied to bear-trap dams, and if so, when?

(Objected to for the same reasons as stated in last objection, and for the further reason that this is an attempt to get into testimony and evidence in this case statements of the complainant which would not be competent if offered by himself under oath.)

Ans. I have, about January, 1880.

210 Int. 5. State as nearly as you can what was the nature of the improvement which your father indicated to you at that time.

(Same objections continued.)

Ans. It consisted of an opening or overflow placed at a point above which the water under the dam could not rise.

Int. 6. What was the purpose of this opening or overflow?

Ans. To regulate the height of water under the dam and to relieve the dam of pressure after the dam reached a certain height.

Int. 7. State whether or not your father indicated to you at that time any means or plans for carrying this improvement into practice.

(Objected to for the same reasons as given in the last objection, and also for the reason that the complainant subsequent to the date about which the witness is testifying, reduced his claims to writing in his application to the Patent Office for a patent upon his so-called invention, and also for the further reason that in the record of the interference herein, the present witness, as well as the complainant, as late as the latter part of November, 1881, testified under oath all that they or either of them knew upon the points now interrogated about, which testimony is a part of the record upon which the complainant's patent issued, and therefore any testimony varying therefrom is now incompetent and irrelevant.)

Ans. He did.

Int. 8. As your father explained to you, what became of the water when it reached the level of this opening or overflow?

(Same objections continued.)

Ans. It was discharged into the lower pool.

Int. 9. Did you know Mr. John Du Bois, of Clearfield county, who is now dead?

211 Ans. Yes, sir.

Int. 10. State whether or not you have ever heard Mr. Arthur Kirk, your father, explain his improvement in bear-trap dams to Mr. John Du Bois, and if so, when and where?

(Objected to as incompetent, irrelevant, not tending to rebut anything in defendant's case, and also for the other reasons set forth in the last objection.)

Ans. I have. About January, 1880, in Mr. Kirk's office.

Int. 11. In what way did Mr. Kirk explain the improvement to Mr. Du Bois?

(Same objections continued.)

Ans. By describing the improvement and illustrating it with a sketch.

Int. 12. What reply, if any, did Mr. Du Bois make to Mr. Kirk's explanation?

(Same objections continued.)

Ans. He said it was not necessary, and condemned it.

Int. 13. What was not necessary?

(Same objections.)

Ans. This improvement of overflow.

Int. 14. How did Mr. Du Bois propose to do without this overflow?

(Same objections continued.)

Ans. He said the third leaf was all that was necessary, and in event of its not answering the purpose he would bolt a timber on the under side of the upper leaf to prevent the lower leaf rising above a certain point.

Int. 15. State whether or not Mr. Du Bois said or did anything to indicate that this overflow which was described by Mr. Kirk, was his, Mr. Du Bois' invention, or that he had known of it before?

(Same objections continued.)

And. He did not.

Recess until 1 p. m.

212 Met at 1 p. m.

NOTICE.—The counsel for the defendant here gives notice that he will move the court to strike out all the testimony of this witness, David M. Kirk, for the reasons set forth in the various objections hereinbefore made. Also, for the reason that all of his testimony is hearsay, and because none of it is competent in rebuttal, and if competent or relevant at all could only be so as part of the complainant's case in chief.

Cross-examination, subject to objections:

X Int. 16. State whether you formerly testified upon all the questions covered by your testimony this day given, in an examination of witnesses in the matter of the interference in the Patent Office of the United States before the Commissioner of Patents, be-

tween Arthur Kirk and John Du Bois, as to movable dams, in the record proceedings whereon the letters patent of Arthur Kirk, No. 268,411, issued?

Ans. I don't think they were.

X Int. 17. Deposition of David M. Kirk contained in pages 7, 8, 9 and 10 of the printed record of the testimony taken on behalf of Arthur Kirk in the interference record between Arthur Kirk and John Du Bois, and taken on November 28, 1881, before R. H. Whittlesey, notary public, shown witness, said printed record being the same filed by said complainant, Arthur Kirk, at No. 15, May term, 1886, in this district, as "Complainant's Exhibit Interference Testimony, January 11, 1886," and being the same re-offered as "Du-Bois Exhibit I," March 24, 1887, in this case; and the witness is asked to look at the same and state whether or not that is a correct report of his testimony as given by him November 28, 1881?

Ans. It appears to be.

X Int. 18. State whether or not your knowledge as to what
213 occurred in January or February, 1880, at your father's office in Pittsburgh, Pa., and as to what conversation or conversations occurred about January or February, 1880, between your father, Arthur Kirk, and Mr. John Du Bois, in connection with said Kirk's alleged invention, was as complete on November 28, 1881, as it is now, April 23, 1887?

Ans. I don't think it was.

X Int. 19. In what way was it less complete?

Ans. I could not say.

X Int. 20. In your former examination, on November 28, 1881, with regard to these same matters, were you any less favorably disposed towards your father, Arthur Kirk, the camplainant, than you are now, or had you any motive for keeping back or concealing your knowledge as to what had been said or done in January, 1880, so far as such knowledge was inquired for by the interrogatories put to you on said former examination, November 28, 1881?

Ans. I had not.

X Int. 21. On said former examination was there any counsel present representing Mr. John Du Bois, or any other reason which would render you more cautious than now in stating fully all that you knew in regard to said occurrences and conversations of January, 1880?

(Objected to as irrelevant and impertinent.)

Ans. Not that I recollect.

X Int. 22. Then at the said former examination, did you fully state all your knowledge as then called for by the questions put to you?

Ans. I can't recollect.

X Int. 23. State whether or not your recollection of conversations and occurrences in or about January and February, 1880, is better on April 23, 1887, than in was on November 28, 1881, without any assistance or suggestions received from persons and circumstances since November 28, 1881.

Ans. I can't say.

214 X Int. 24. Have you talked with your father, Arthur Kirk, the complainant, with regard to the matters upon which you testified in your former examination on November 28, 1881, since that date?

(Objected to as irrelevant and immaterial.)

Ans. Yes, sir.

X Int. 25. State as far as you can recollect the substance of such conversations with your father.

(Objected to as irrelevant and improper cross-examination.)

Ans. I couldn't recollect the details.

X Int. 26. State whether he gave you in any of these conversations any information as to what had been claimed by the defendant, either in his pleadings, testimony or evidence in this case.

(Same objection.)

Ans. He did, to some extent.

X Int. 27. Can you recall whether or not the complainant, Arthur Kirk, stated to you since November 28, 1881, what John Du Bois had claimed in his pleadings, testimony and evidence, in the suits, brought by your father against him?

(Same objection.)

Ans. He did to some extent.

X Int. 28. State as far as you can recollect any of the claims which your father told you had been made by either John Du Bois or John E. Du Bois, in pleadings, testimony or evidence in said suits.

(Same objection.)

Ans. About all he said was that the said John Du Bois and John E. Du Bois denied his claim *in toto*.

X Int. 29. Have you received any suggestions from your father, Arthur Kirk, or from any other person, or from any other source, that have given you any additional knowledge or light since November 28, 1881, upon the subjects with regard to which you
215 were interrogated at that date, and if so, state the suggestions, from whom received, and also the names of all persons with whom you have talked in regard to the same?

(Same objection.)

Ans. Not that I recollect.

X Int. 30. The attention of the witness is called to Int. 4 and his answer thereto in his former testimony, which are as follows: "Int. 4. Please give as far as you can remember, the general plan of this improvement you speak of? Ans. It consists in making an opening in the lock wall, or in the shore wall of the dam, this opening to be connected by a channel or pipe of sufficient capacity with the lower pool of this dam."

Attention of the witness is also called to Int. 5 and his answer thereto in the present testimony, which are as follows: "Int. 5.

State as nearly as you can what was the nature of the improvement which your father indicated to you at that time? Ans: It consisted of an opening or overflow placed at a point above which the water under the dam could not rise."

State whether or not your answer to Int. 5 is intended to describe the same invention as your former answer to Int. 4?

Ans. They refer to the same thing.

X Int. 31. Then said two answers are intended to describe the same construction are they?

Ans. Yes, sir.

X Int. 32. The attention of the witness is called to Int. 10 of his testimony in the interference record, which is as follows: "Int. 10. You speak of water passing out through an opening, does this water come from the upper pool or from between the wings of the dam? Ans. Between the wings of the dam."

And also to Int. 8 in his testimony in this hearing and the answer thereto, which are as follows: "Int. 8. As your father explained to you, what became of the water when it reached the level of this opening or overflow? Ans. It was discharged into the lower pool."

216 In your answer to said Int. 8 do you mean to describe the same water and the same overflow as in your answer to said Int. 10?

Ans. Yes, it refers to the same.

X Int. 33. State whether or not, in your present testimony with regard to conversations occurring between your father, Arthur Kirk, and John Du Bois, you testify as to any conversations other than those with regard to which you testified in your former testimony in the interference proceedings, November 28, 1881, also whether in your present testimony you include any conversation or conversations between said parties named, other than those which occurred at your father's office about January, 1880?

Ans. Well, I can't recollect that distinctly.

X Int. 34. State whether or not you have been in your father's office, and connected with him in business, every since January, 1880, or before that time, and if so, how long, and whether or not during the entire period of your association you have used the same office?

Ans. I have been in the same office since 1880. I was there off and on before that time, but permanently about that time.

X Int. 35. State whether, prior to 1880, you heard frequent conversations between Arthur Kirk and John Du Bois?

Ans. I think I heard conversations between them prior to 1880.

X Int. 36. Prior to 1880, did Arthur Kirk take a great deal of interest in Mr. Du Bois' improved dam?

(Objected to as improper cross-examination.)

Ans. He did.

X Int. 37. Have you at the office the original sketch that Arthur Kirk made of his invention?

Ans. Not that I know of.

Counsel for defendant offers in evidence in connection —
217 the witness' cross-examination, his former deposition in the interference proceedings in the Patent Office contained in pages 7, 8, 9 and 10 of said record, which record is entitled "Du Bois Exhibit I, March 24, 1887."

Counsel for complainant offers in evidence a certified copy of the record of interference proceedings between Arthur Kirk and John Du Bois, subject "Movable dams," including a certified copy of the preliminary statements, forming part of said record, and the same is marked "Complainant's Exhibit Interference Record."

(Objected to as incompetent and irrelevant, and not proper rebuttal of anything contained in defendant's case.)

DAVID M. KIRK.

Testimony taken on behalf of complainant in rebuttal, pursuant to notice hereto annexed, before Schuyler Duryee, a notary public and special examiner, by order of court.

Present: Thomas W. Bakewell, Esq., for complainant. No one appeared for defendant.

F. W. RITTER, Jr., Esq., a witness produced on behalf of complainant, being duly sworn, deposes and says in answer to interrogatories propounded by Mr. BAKEWELL, as follows:

Int. 1. State your name, age, residence and occupation.

Ans. Frederick W. Ritter, Jr.; age, 44 years; residence, Washington, D. C.; occupation, attorney-at-law, solicitor of patents, and expert in patent causes.

Int. 2. What experience have you had in patent matters?

Ans. I have had about twenty years' experience in patent matters, six or seven years as a member of the examining corps of the U. S. Patent Office, where my duties required me to examine alleged inventions, search the prior state of the art, institute comparisons, consider the principles involved and the method of applying the principles, and determine questions of novelty and patentability under the statute, and the interpretations thereof by the
218 United States courts. The balance of the time, about thirteen years, as solicitor of patents, I have prepared a large number of specifications, presented and prosecuted a large number of cases before the Patent Office, which required that I should exhaustively examine the state of the art relating to various classes of inventions, fully and clearly describe inventions, point out similarities and differences; distinguish between such as were formal, and such as involved invention under the statute, to describe the principles involved and their mode of application, and to generally do and perform all acts relating to the securing of patents for inventions and explaining the scope and character thereof. As an expert, I have been frequently called upon to testify in such matters, and as counsel I have frequently been called upon to give opinions in all matters relating to the legal and mechanical questions involved in patent suits.

Int. 3. State whether or not you have examined and are familiar with the Kirk patent, No. 268,411?

Ans. I have examined, and am familiar with it.

Int. 4. What knowledge, if any, have you of bear-trap dams of the kind described in the Kirk patent?

Ans. I gained a general knowledge of this class of dams from my searches in connection with the prosecution of the Kirk application for a patent in 1881, and since then have examined and studied a number of working bear-trap dams embodying the invention involved in this controversy.

Int. 5. State whether or not you have read and considered the testimony of the following witnesses given in this case: Anthony H. Trimble and Thomas P. Roberts on the part of complainant, and Frank M. Reese on the part of the defendant, and have you examined the model, drawings, sketch, and Patent Office documents filed as exhibits?

Ans. I have.

Int. 6. What do you understand to be the gist of the testimony of these witnesses?

219 Ans. I understand Trimble's testimony to be a description of a bear-trap dam which he saw and examined on the 28th of September, 1886, at Du Bois, Clearfield county, Pa., and which is illustrated in "Exhibit Kirk Sketch A," sheets 1 and 2. I understand that, according to Trimble's evidence, said dam had an upper leaf marked F, a lower leaf marked E, and a fore bay J, that the lower bulkhead or end wall of the fore bay was five feet lower than the upper bulkhead or end wall of the fore bay; and that the top of the lower bulkhead or end wall was considerably lower than the comb of the dam when up. I find in the "Exhibit Kirk Sketch" (Fig. 1, sheet 1,) that there is an open water-way from the chamber below the leaves into the fore bay, and that the line A, indicating the water level of the pool above, rises to the comb of the dam when up, that the water level B in the chamber beneath the leaves is indicated as considerably below the level of the upper pool, and as the same level as the point marked "overflow" indicating the top of the lower end wall or bulkhead, so that there is an open sluice, water-way, or tail race arranged relatively to the dam, that the water which is not required to support the dam leaves will escape and relieve the dam of all unnecessary pressure.

I understand the testimony of Thomas P. Roberts to be to the effect that as a question of mechanical construction, object and function and result, that this construction testified to by Trimble is substantially the same as what Kirk shows in Fig. 4 of his patent 268,411, and a full equivalent for what Kirk shows in Fig. 2 of the patent, and as embraced within the terms of the sixth claim thereof. In cross-examination Mr. Roberts expresses it as his opinion that the dam is relieved by the outward flow of the surplus water from the chamber below the leaves into the fore bay and thence over the overflow at the lower end of the fore bay, but rests his evidence on the fact that Kirk is the first who had an open water-way from the chamber beneath the dam at a lower level than the comb of the dam

when up, and that according to the well-known law that
220 fluids will seek their level, there could be no standing water below the leaves of the dam above the level of that overflow, because the fore bay and the opening from the same under the leaves of the dam constitute an open sluice extending from under the gates to the overflow so as to relieve the dam from unnecessary pressure, and for the further reason that the pressure on the dam leaves could only be that of the standing column in the fore bay.

I understand Frank M. Reese's testimony to be identical with that of Thomas P. Roberts' as to the construction in controversy, but that his (Reese's) theory of the manner in which the construction operates is different. Reese's whole testimony is but a repetition of the one idea differently stated, viz: that the fore bay and chamber below the gates, having become filled with water to the level of the overflow or tail race at the lower end of the fore bay, any more water which enters the fore bay from the pool above will immediately run out at the overflow and not affect the chamber below the gates in any manner; it is what he calls a prevention and not a relief.

Int. 7. Consider the deposition of Frank M. Reese, the defendant's expert, and state in what respect you agree or disagree with what he says concerning complainant's patent 268,411, and concerning the construction of defendant's dams considered with relation to the patent? State, if you please, the reasons for your answer.

Ans. Reese's deposition purports to be an attempt to construe the invention described in the Kirk patent 268,411; and presumably the scope of Kirk's sixth claim involved in this suit, as the claim, as is well understood, is the extent of his franchise. In doing this, he considered the form of application shown in Fig. 2 of the patent, the tail race 38, and argues therefrom that Kirk's intent was to cause all the water to pass from the fore bay under the leaves and out from the chamber below the leaves continuously. To quote his language: "The characteristic feature of his in-
221 vention is an open sluice, tail way or water-race, extending from the chamber beneath the leaves down to the pool below, and adapted to carry off superfluous water admitted previously into this chamber beneath the leaves when it reaches a certain height." I quote from Reese's thirteenth answer. Then he considers Kirk's Fig. 4 (fourteenth answer) and construes the devices there shown as devices which must necessarily cause the gate chamber to receive and discharge the water in the same manner as open sluice 38, that it must be a closed well at one side of the dam with an overflow below the comb of the dam, and so arranged with relation to the dam that all the water shall pass continuously from the fore bay into the dam, and the surplus water thence into the well and out over the overflow, or in other words, that there must be a continuous current through the dam chamber below the leaves from the fore bay to the overflow. Reese then considers the defendant's devices as shown in Trimble and defendant's exhibit model, and argues that as there is no open sluice, like 38 of complainant's patent, which takes the water from the highest desired level in the gate chamber and dis-

charges it into the lower pool, shown in such devices, and he says that because there is no independent and distinct well at one side of the dam which receives the surplus water from the chamber below the dam and discharges it by an overflow lower than the comb of the dam, or the height at which it is desired the leaves shall stand, and because the water from the upper pool discharges from the fore bay instead of from an independent well, or an independent open sluice, therefore (to quote from Reese,) "the construction and principle of operation and the function of dam No. 8, so far as the means for regulating the pressure upon the wings of the dam are concerned, is different."

On this theory of a difference in operation of the devices, Reese construes the sixth claim of the Kirk patent to be for any equivalent for those devices shown in the patent, which devices
222 shall operate on a given principle or theory, which theory he deduces, not from the patent itself, but from his construction of how the devices shown in the patent operate. In order to reach this conclusion, Reese has to argue and explain away some of the direct language of the patent, for instance: "outlet 39 into a fore bay or well 40, and thence over the bridge 41," (line 125, page 2, Kirk patent.) "It is apparent that the form, place and details of construction of the sluice for relieving the gates from excessive pressure below can be varied by the skillful constructer, but in all cases an open channel will be necessary when the water has reached a certain height or pressure under the gates," (page 2, line 129 *et seq.*, Kirk patent.)

Unless there is positive evidence to the contrary, it is legally conclusive that the inventor and the Patent Office understood the word "forebay" in its common acceptance, and it is also a legal presumption that the office and the inventor (Kirk) meant that the open sluice, wherever it was, was to relieve the pressure under the gate.

In order to make plain the points wherein I differ in my opinion from that given by Reese, it will be necessary to give a general statement of what I understand to be the state of the art prior to the Kirk invention.

Bear-trap dams were constructed of two side walls, which formed the end walls of the dam, and between which the leaves of the dam were arranged and pivotally connected to the foundation, the upper leaf overlapping the lower leaf. At one end of the dam was a fore bay, whose upper and lower bulkheads were the same or substantially the same height, and that height was the height required by the upper pool. In the end wall of the dam, next the fore bay, was an open water-way or communication between the fore bay and the dam chamber beneath the leaves. At the bottom of the upper and lower bulkheads of the fore bay were wickets for the admission and discharge of water to and from the fore bay. In operating the dam, the wicket in the upper bulkhead was raised, the fore bay allowed to fill and the chamber
223 beneath the leaves to fill therefrom until the dam was raised. The pressure on the leaves of the dam from beneath was

that of the upper pool and of the column of water in the fore bay, which was the same height as the water in the upper pool. As a result, it frequently happened that the pressure exerted on the leaves of the dam was sufficient to turn the lower leaf over down stream and wreck the dam. To prevent this, chains and cleats had been used to confine the leaves, but were found to result in injury to the foundation and structure of the dam, which could not resist the additional hydrostatic force brought on them. As a general illustration of what I mean by the preceding description, I herewith offer as an exhibit, a copy of patent 135,023, dated January 21, 1873, to H. Werner, which I ask may be marked as "Exhibit Ritter," and made a part of this answer.

At this point in the history of the art, Kirk evidently conceived the idea of an open water-way or sluice, which should limit the height of the column of water which was capable of exerting pressure under the gates. In his patent 268,411, page 1, line 39, he says that his invention consists "of an open sluice, water-way or tail race, so arranged relatively to the dam that the water which is not required to support the leaves, will escape and so relieve the dam of all unnecessary pressure."

It is a well-known fact that pressure in water is the result of force of flow and height of column and nothing else; consequently it is apparent that Kirk had in view devices to relieve this force of flow and height of column. In order to distinguish his invention from the wickets of the fore bay, hereinbefore referred to, in pointing out the means which he uses and which he intended should be automatic, he starts this statement of his invention with these words: "an open sluice, etc." Then, further on in his specification, (page 2, lines 109, *et seq.*) he describes two specific ways of accomplishing this result, and illustrates them on figures 2 and 4 of the drawing, one (Fig. 2) of limiting the height of the column by an overflow situate within the dam chamber, and the other by an overflow situate without the dam chamber, both of which operate in the same generic way, and both have their advantages. For instance, in the construction shown in Fig. 2, where the overflow is situate within the dam chamber, if the gates should stick before reaching the height of the open sluice 38 and unclosing the same, the whole head of the pool above could be exerted on the gates to bring them to their proper height, whereas in the way shown in Fig. 4, if the resistance of the gates, from sticking or other cause, was greater than the column of water limited in its height by the outside overflow, 41, the gates could not be raised without building up the bulkhead of the fore bay or well, or otherwise increasing the height of the overflow 41.

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The advantage of the exterior overflow would lie in the cheapness of construction, as it would be easier to form the same than to cut through the wall of the dam as at 38.

In Kirk's patent (page 2, line 109, *et seq.*, before referred to) he describes tail race 38 (Fig. 2) as one specific way of producing the result, and in that paragraph, describes how the water, after raising the gates and opening the sluice 38, will pass around the end of the

gate and flow off, in which case there would be a continuous current from the fore bay through the chamber beneath the gates as stated by Reese. In the paragraph of this specification immediately following, commencing with line 122, he describes Fig. 4, which he distinctly states is a modified form, not intended to be the same construction, but only to obtain the same result in the same general way, and he then says, referring to the water: "The latter passing through the outlet 39 into a fore bay or well 40, and thence over the bridge 41." This he immediately follows in his description by as broad and general terms as it is possible for a man to use, making but one limitation on his language, and that a specific one, viz: "But in all cases, an open channel will be nec-
225 essary when the water has reached a certain height or pressure under the gates," and this limitation is identical with the limitation with which he starts out in the commencement of his pecification. (Page 1, line 39, *et seq.*)

On examining the specification, I find that he invariably uses several terms to express the same idea, and to give it a general or broad signification. For instance, "open sluice, water-way or tail race," and again, "fore bay or well," and again, "form, place and details * * * can be varied." I further find that he is specific in the thing to be guarded against. On page 1, line 43, "unnecessary pressure," page 3, lines 2 and 3, "pressure under the gates." Further, I nowhere find him using the term "superfluous water," which is used by Mr. Reese. Consequently it is apparent from Kirk's specification, that the whole object, aim and purpose of his invention is to avoid excessive pressure, not "superfluous water." This is all summed up in his sixth claim of the Kirk patent, which claim is constructed by first stating the means claimed, viz: "Open sluice extending from under the gates," second, manner and function, "so as to relieve them (the gates) from unnecessary pressure." Referring to Trimble's testimony, (Exhibit Kirk Sketch A, sheets 1 and 2,) and to defendant's model, I find an "open sluice extending from under the gates," to wit: open water-way marked M, (Figs. 1 and 2 of the sketch) which causes the chamber under the gates to communicate with the fore bay and then the overflow of the fore bay, the whole of which constitutes the open sluice, and operates "so as to relieve them from unnecessary pressure."

To state the whole thing in other words, I find in the "Kirk Sketch A," an open water-way from under the dam, with a discharge at a point lower than the comb of the dam, and lower than the level of the upper pool, and that this open sluice or water-way has no other function, and is capable of no other function, and can accomplish nothing else than to relieve the gates of unneces-
226 sary pressure. Pressure can only be brought on these gates by the height of the water in the pool or the fore bay. Before Kirk's time there were no means, so far as I am aware, or have been able to ascertain, of controlling the height of the column of water which exerted the pressure on the under side of the gates, except the old inlet and outlet wickets of the fore bay, which were not open sluices. Kirk's invention consisted, as set forth in his

patent and embraced in his sixth claim, in an open sluice, the form, place and details of which were immaterial so long as they relieved the gates of excessive pressure, and so far as anything that I can find in Kirk's specification, the direction of the current or where the "superfluous" water goes is immaterial. Where Kirk refers to the direction of the current, it is simply a matter of description, not a condition of the invention. Kirk, so far as his specification goes, has no theory of how the devices are to operate, except that they are to limit the height of the column of water which causes pressure from below on the gates, and is the cause of the whole trouble, and what he (Kirk) intends to indicate in his patent is that the overflow, which limits the height of the column pressing on the gates, may be within the dam chamber, as shown in Fig 2, or exterior to it, as shown in Fig. 4.

So far as he goes, I agree with Mr. Roberts, that the direction of the current of water would depend on the amount of leakage through the upper gate into the dam chamber, and that the question of the amount of pressure on the gates would be determined by the height of the overflow, no matter whether it was interior or exterior to the gate chamber, provided that there was an open waterway or sluice connection from the chamber below the gates to the overflow, because the height of the overflow in either case would determine the height of the column of water under the gates, and the height of the column under the gates would determine the hydrostatic pressure on the gates.

227 The whole sum and substance of the Kirk invention is the provision of means for controlling the height and pressure of the column of water in the gate chamber, which exerts its force on the gates, and the whole extent of the means is an open sluice or overflow which shall keep that column at the desired height; and as from the nature and construction of bear-trap dams and the known law of fluids, the height of the column of water, (or more accurately speaking) the pressure of the column of water in the dam chamber must coincide with that in the fore bay, and as the two are connected by an open water-way, to regulate the height of the column in the one, is in effect to regulate the column in the other. This is substantially Mr. Robert's testimony, and is exactly as I understand the Kirk invention covered by the patent. It differs from Mr. Reese's testimony as to the scope of the patent, in that Mr. Reese constructs a thory of a continuous flowing current, and construes the sixth claim of Kirk's patent to be based upon and cover that principle of operation, whereas there is not a word in the sixth claim of the Kirk patent to warrant the same, and not a line in the specification, except a matter of description as to which way the current would run under certain conditions which are not necessary to the invention. Neither Kirk's claim nor his invention is for a method or principle of operation, but for a definite construction to obtain a given result, and I find in defendant's dam the construction claimed.

Int. 8. State what you understand Fig. 4 of the drawing of the

Kirk patent 268,411, and the part of the specification descriptive thereof to represent.

Ans. Fig. 4 of Kirk's patent is simply one illustration of a construction in which the open sluice, extending from under the dam, can be obtained by utilizing the fore bay, common to dams as then constructed, or by locating a well on one side of the dam.

I understand the word "forebay" to mean what is commonly understood by the word forebay, and the word "well" to mean something broader, viz: a chamber independent of the
228 fore bay, and the whole description (line 125, page 2, Kirk specification) to mean and be intended to convey the idea that the fore bay, or any equivalent thereof, could be provided with a bridge wall 41, or overflow, at a height lower than the comb of the dam, to control the height and pressure of the column of water under the gates.

I was connected with the Kirk application as associate attorney in prosecuting the application upon which letters patent No. 268,411 were granted, and I then understood the language to mean the same as above stated.

Int. 9. State whether or not you are familiar with the dam No. 8 on the "Exhibit Kirk Map," and if so, when did you see it?

Ans. I examined this dam on April 13, 1887.

Int. 10. State whether or not this was a fair dam on which to make the experiments testified to by Mr. Reese in his 8th, 9th, and 10th answers, and by W. R. Gray in his deposition? Give your reasons.

Ans. It was not, when I saw the dam on the afternoon of April 13, 1887, because the lower end wall of the fore bay was leaking like a sieve, and if the wicket in the upper end of the fore bay were closed the flume could have about emptied itself through the lower bulkhead. The ends of the transverse planks on the land side of the lower head of the fore bay, seemed as though they had rotted away, and there were spaces through which the open hand could be passed.

Int. 11. Look at "Du Bois Exhibit J," the file-wrapper and contents of the Du Bois patent 251,771, and state whether or not you find anything therein in recognition of Mr. Kirk's patented invention, as stated in the sixth claim of his patent?

Ans. I do. I find in this exhibit a petition, oath, and specification forming part of an original application for letters patent, and a letter from the attorney and filed in the case stating that this application is a division of one involved in an interference with
229 Kirk, that this application, as presented, embraces only matters not involved in the interference, and setting up in an *ex parte* manner that "in Kirk's case the only arrangements shown or described are those in which the water is first admitted beneath the dam and then permitted to escape through a separate overflow and opening at the opposite end of the same."

I also find in this original specification that the same matter in substance was inserted on page 4 as a disclaimer to meet the understood requirements of the office that the division of an application

which is made a new case, must, if that application is in interference, disclaim the interfering matter. I also find that the office, in a letter dated December 1, 1881, stated that as "this application is carved out of a pending application showing the identical features, and embracing a broad claim to the supply regulating features herein contained, this case should distinctly disclaim said features, that no misunderstanding may exist should the other case go to patent." Whereupon a broad disclaimer as follows was inserted: "I do not claim broadly herein the combination with a flexible dam of an overflow by which the water can escape after reaching a fixed limit of elevation, the same constituting the subject-matter of a prior application."

This was, and was meant to be an acknowledgment that the invention contained in the new application involved the principle, and was subordinate to the prior application that was in interference. Therefore the insertion of such a disclaimer, at the request of the office, was a record acknowledgment of the subserviency of the devices shown in this application to the claim for the devices which were in interference.

Int. 12. What knowledge have you of the practice and rules of the Patent Office with relation to interference proceedings, as they were in the years 1881 and 1882?

Ans. I was then practicing before the Patent Office and was familiar with the practice.

230 Int. 13. What was the practice in case an interfering applicant thought that his application set forth a different invention from that embodied in his adversary's claim?

Ans. The practice was to move for a dissolution of the interference on the ground that in fact no interference existed, and this should have been done, under the rules, before the filing of the preliminary statements, under rule 116 of the rules of practice. If it was the intention to take out the new matter or to accept a limited and subordinate claim, then the case was divided and a disclaimer of the interfering matter made in the new application, as was done in this case, which as a matter of practice, was regarded as an admission that the interference was properly declared as to the matter remaining in the old case, and belonged to the one who was proved to be the prior inventor.

Counsel for complainant gives notice, that before the conclusion of his testimony in rebuttal, he will offer in evidence a certified copy of the file-wrapper and contents in the application for the Kirk patent No. 268,411.

F. W. RITTER, JR.

Testimony taken at the office of the Hon. William H. Bradley, clerk of the United States circuit court for the northern district of Illinois, April 26th, A. D. 1887, before S. W. Burnham, United States commissioner, special examiner by consent of the solicitors for the respective parties.

EDWIN F. BEUGLER, a witness called on behalf of the complainant, having been duly sworn, testified as follows:

Direct examination by Mr. Bakewell:

Int. 1. State your name, age, residence and occupation.

Ans. Edwin F. Beugler; age, thirty-seven; 20 Ogden avenue; dealer in coal and wood.

Int. 2. State whether or not you knew Mr. John Du Bois, the uncle of the defendant in this case?

Ans. I did.

231 Int. 3. What business connection, if any, have you had with him?

Ans. I was employed by him as a mechanical engineer.

Int. 4. During what period of time?

Ans. From 1872 to 1883, including 1872, which makes a period of eleven years.

Int. 5. During what part of that time were you at Du Bois, Clearfield county, Pennsylvania?

Ans. From 1875 until 1883.

Int. 6. State whether or not you know of any bear-trap dams having been built at Du Bois during that time?

(Objected to as incompetent and irrelevant, and not tending to rebut any portion of the defendant's case. The defendant here gives notice that he would move to strike out the testimony of this witness.)

Ans. I do.

Int. 7. What, if anything, did you have to do with the construction of these dams?

(Same objection and notice continued.)

Ans. I made the drawings and superintended the construction of the iron and wood work, and in some instances, the construction of the dams themselves.

Int. 8. State whether or not you remember a visit of a delegation of gentlemen from Pittsburg representing the chamber of commerce to inspect a bear-trap dam at Du Bois, about the year 1879?

(Same objection and notice continued by T. H. Baird Patterson, attorney for defendant.)

Ans. I do.

Int. 9. What, if anything, did you have to do with the construction of this dam which was visited by these gentlemen?

(Same objection and notice continued by counsel for defendant.)

Ans. Made the plans and helped build the dam.

232 Int. 10. State whether or not you were familiar with the dam as it was when completed?

(Same objection and notice continued by counsel for defendant, and also objected to on the ground the question is leading.)

Ans. I was.

Int. 11. How was this dam constructed with regard to its forebay walls; I mean as to the height?

(The same objections and notice continued.)

Ans. They were built of plank spiked on to the entire height of the structure.

Int. 12. In this answer do you refer to all or to some of the fore-bay walls?

(Same objection and notice continued.)

Ans. All.

Int. 13. How were the fore-bay walls of the other dams which were built at Du Bois constructed, up to the time when you left there early in 1883?

(Same objection and notice continued.)

Ans. Either boarded or planked up to the top of the structure, or above the water line of the pool.

Int. 14. Do you mean all or some of the walls.

(Same objection and notice continued.)

Ans. I mean all.

Int. 15. State whether or not, up to the time of your leaving Du Bois, any of the bear-trap dams there were provided with an overflow in the fore bay, through which the water would flow before it reached the water level in the upper pool?

(Same objections and notice continued by counsel for defendant.)

Ans. They were not.

Int. 16. With whom did Mr. John Du Bois consult concerning the plans and construction of his bear-trap dam?

(Same objections and notice continued by counsel for the
233 defendant, and also for the reasons the question asks for an answer which it is impossible for any witness to give excepting John Du Bois, deceased.)

Ans. Myself for one.

Int. 17. What devices, if any, did Mr. John Du Bois employ on his dams while you were at Du Bois for resisting the upward hydrostatic pressure on the dam leaves?

(Same objections and notice continued by counsel for defendant, and also for the reason that it is incompetent to prove in this case for purposes of rebuttal any other devices than those in question in the case, because this is an attempt to prove an inferential negative.)

Ans. A third leaf, and cleats secured to the side walls of the dam.

Int. 18. Do you know Mr. C. F. Fuller, of Du Bois?

Ans. I do.

Int. 19. What was his position, and in whose employ was he during your stay at Du Bois?

Ans. He was employed by John Du Bois to superintend his farming operations.

Int. 20. What connection did he have with the bear-trap dams?

Ans. He aided in their construction during the intervals of his farming operations.

Cross-examination by Mr. T. H. B. PATTERSON, attorney for defendant:

X Int. 21. State when you left the employ of John Du Bois.

Ans. January 1, 1883.

X Int. 22. State when you went into his employ, and in what capacity?

Ans. January 1, 1872; the first year as a machinist; all time thereafter as a mechanical engineer, having entire charge of his mechanical operations.

234 X Int. 23. Prior to your going into the employ of John Du Bois, in whose employ were you, and what were you doing?

Ans. For two years previous in the employ of Wonderly and Company, of Grand Rapids, Michigan, for whom I erected and operated a large planing-mill.

X Int. 24. Prior to that, in whose employ were you, and what were you doing?

Ans. The year previous to that I managed the planing-mills for the Beaver Mills Lumber Company, of Williamsport, Pennsylvania.

X Int. 25. Prior to that in whose employ were you, and what were you doing?

Ans. Six months prior to that I was with Goodlander & Company, of Williamsport, in charge of their planing-mill.

X Int. 26. Prior to that in whose employ were you?

Ans. With Potter & Company; first, as factory hand, then as foreman of their planing-mill until the mill burned.

X Int. 27. During all these times what salary did you get, and what character of machinery were you running; steam or otherwise?

(Objected to by Mr. Bakewell as immaterial.)

Ans. As a boy, $1.25 per day; as foreman, from $4.00 to $4.50 per day; the machinery was in all cases driven by steam.

X Int. 28. While in the employ of John Du Bois, deceased, were your duties not chiefly confined to the mills, and more especially to the machine shops, during almost your entire time during working hours?

Ans. My duties while with Mr. Du Bois were of such a general character as to necessitate the employment of special shop foremen in order to allow me to answer his calls in any direction, both building dams, mills, &c.

X Int. 29. Question repeated and witness is asked to answer it.

Ans. Yes, except such time as we were building dams.

235 X Int. 30. State how many hours of actual time you ever spent in building dams while in the employ of John Du Bois; I mean the actual work upon the dams?

Ans. During the time the dams were being built a great portion of each day was devoted to the making of plans and superintending the construction of the various parts required for the dams, as well as superintending the construction of the dams themselves.

X Int. 31. Question repeated and the witness is asked to answer.

Ans. Owing to frequent calls in other directions, and to the fact that my time was not kept by the hour, it is impossible for me to state.

X Int. 32. Can you state the names of the workmen and foremen who actually did the carpenter-work on the dams of which you have been speaking?

Ans. William Gray, George Gorton, C. F. Fuller, and others whose names I do not now recall.

X Int. 33. Your skill was chiefly confined to machinery and the construction and arrangement of metals in connection with the use of machinery and steam, was it not? You were not a carpenter, framer, or other skilled workman in wood-work, were you?

Ans. My duties as mechanical engineer required me to give my attention to the erection of mill buildings, dams, &c., as well as superintending the construction of the machinery belonging thereto.

X Int. 34. You were not a carpenter, were you?

Ans. No.

X Int. 35. You were a machinist, were you not?

Ans. Strictly speaking, no; although I have worked in both iron and wood to a very considerable extent.

X Int. 36. Was not your business prior to your coming to Mr. Du Bois chiefly working in metals?

Ans. No.

236 X Int. 37. Was it not chiefly in working with mechanical constructions which were chiefly constructed of metal?

Ans. The machinery which I operated was constructed of both iron and wood.

X Int. 38. Question repeated.

Ans. In many cases the frames were of wood, while the moving parts were of metal.

X Int. 39. In point of fact, were not the Du Bois improved bear-trap dams chiefly composed of wood?

Ans. They were.

X Int. 40. Was not the wood-work on those dams chiefly done by carpenters?

Ans. The timbers of which the dams were built was prepared by millwrights on special framing machinery in one of the mills belonging to John Du Bois.

X Int. 41. Will you please go on and finish the answer?

Ans. The iron-work was built at the machine shops of John Du Bois, and the various parts taken to the site of the proposed dam, and there assembled by ordinary workmen.

X Int. 42. Were these ordinary workmen, carpenters or wood-workers generally; that is, the men that did the actual work on the dam?

Ans. Some were, but the majority were not.

X Int. 43. State, if you please, the names of any workmen, that did the actual putting up of them, who were not carpenters or wood-workers.

Ans. C. F. Fuller, William R. Gray and others whose names I do not now recollect.

X Int. 44. Are millwrights wood-workers; millwrights who do the preparing of timber?

Ans. Yes, both wood and iron.

X Int. 45. Are framers wood-workers or carpenters?

Ans. Yes.

X Int. 46. What is the relative proportion of iron or
237 other metal to the amount of wood in one of the Du Bois improved bear-trap dams?

Ans. The bolts, rods, hinges, wickets and other iron-work necessary to the building of the dams constitute a large proportion of the entire cost of the dam.

X Int. 47. Question repeated.

Ans. May I ask an explanation; do you mean the weight or in bulk?

X Int. 48. In bulk, of course.

Ans. The proportion of iron to wood in bulk would be small, although varying greatly with the size and proportion of the dam.

X Int. 49. State how much variance there was in the size and bulk of the Du Bois improved bear-trap dams which existed at Du Bois when you left there; that is, what was the size of the largest one and what was the size of the smallest, and what was the size of the intermediate ones?

Ans. The height to which the gates would rise varied from four feet to seventeen, although the greater number were of small elevation; say from five to seven feet.

X Int. 50. What was the variation in width?

Ans. From six to twenty feet.

X Int. 51. How many of these improved bear-trap dams had been built at the time you left the employ of Mr. John Du Bois?

Ans. Six or seven.

X Int. 52. Did you assist in the same way at the building of each one of these six or seven dams?

Ans. I did not; my intention being given chiefly to the first dam built, known as the Chamber of Commerce dam.

X Int. 53. Then, the other dams after the first one, were chiefly built by the foreman and workmen engaged thereon under the direction of Mr. John Du Bois, were they not?

238 Ans. They were chiefly built under Mr. Du Bois' personal direction from plans made by me, also under his direction.

X Int. 54. Were not the first dam and all these dams built under the personal direction of John Du Bois?

Ans. Mr. Du Bois was usually present, and the plans made by me under his direction were carried out by the workmen employed for that purpose.

X Int. 55. Did not Mr. John Du Bois make any changes in the construction that he chose to make?

Ans. The framing of the timbers and construction of the iron-work would permit of very few changes, if any, unless such change was contemplated in the plans.

X Int. 56. Would the plan in any way prevent the knocking off

of plank on one of the fore-bay walls, or the putting on of narrower plank thereon?

Ans. The plans would not prevent any damage being done to the dam after building, whether intentional or otherwise, that is, as I understand the question.

X Int. 57. After the work of constructing any one of these dams, did the dam not pass out of your charge and department, into the hands of others who used and took care of the same?

Ans. My attention was frequently called to the dams after completion for the purpose of making repairs and exhibiting the same to interested parties.

X Int. 58. State any occasions upon which you were called to exhibit those dams, or any particular dam, to interested parties after the same had been completed for any considerable length of time?

Ans. I have frequently accompanied parties visiting Du Bois to the dam known as the Chamber of Commerce dam, for the purpose of showing and explaining the operation of the same, Arthur Kirk being one of the number.

X Int. 59. Was Arthur Kirk along with you more than once?

Ans. That I do not remember.

239 X Int. 60. Does not the height of the water vary very much in Sandy creek at Du Bois at different times in the year?

Ans. The volume varies greatly, but the height does not, owing to the remarkably low banks of the stream.

X Int. 61. Isn't the trouble from excessive pressure of water under the leaves of the improved bear-trap dam in the creek at Du Bois confined chiefly to times of flood, or high water?

Ans. It is.

X Int. 62. Now, in time of flood, when the water gets very high, would not the water below the dam get so high that any overflow or escape flume from under the gates would be flooded out, and the operator of the dam be compelled to rely upon stop cleats, or a third leaf, or some other similar device to keep the dam leaves from being floated over?

(Objected to by Mr. Bakewell, because the witness has not been offered as an expert, and it does not appear that he has ever seen an overflow or escape flume, such as is referred to in the question; the question is therefore improper on cross-examination.)

Ans. If the submerged dam was of any considerable width, a third leaf, or stop cleats, would not prevent the rising of the gates, and the possible floating out of the same.

X Int. 63. Would the stop cleats or third leaf have a tendency to prevent such floating out of the dam leaves in such dams as were in existence at Du Bois when you left there?

(Same objection by Mr. Bakewell.)

Ans. A third leaf would not, from the fact that its tendency to float would be as great as that of the gates, but on the narrowest of

the dams built at Du Bois the stop cleats might prevent the gates from rising too far.

X Int. 64. Were not the third leaves then put on the dams
240 at Du Bois chiefly for the purpose of preventing the logs or debris from being precipitated over the upper edge of the upstream leaf, so as to strike and damage the lower leaf, when no third leaf was there?

Ans. The chief object of the leaf was to prevent the rising too far of the gates, it being strongly constructed for that purpose and serving no useful purpose during the passage of logs, inasmuch as the gates were lying flat upon the foundation timbers of the dam.

X Int. 65. That is, when the gates were down on the bottom of the chute, but when the gates were partially or altogether up, and there was sufficient water to pass logs or debris over the upper dam gate, did not the third leaf then protect the lower leaf, both from the action of logs, debris and water, and was it not so used and intended?

Ans. Owing to the accidental washing away of the third leaf on one of the dams, it was operated for some time without the leaf, and no injury resulted to the lower gates from the passage of logs, etc.

X Int. 66. Prior to that accident had not the third leaf been relied upon to prevent such injury?

Ans. The chief office of the third leaf, as well as that of the cleats, was to prevent the gates from rising too far.

X Int. 67. You were in the employ of John Du Bois, were you not, throughout the year 1882?

Ans. Yes.

X Int. 68. Did you know of his preparing and publishing in pamphlet form a history of the Du Bois dam, and of the improvements in the system of building dams which he prepared and published January 2, 1882?

(Objected to as improper on cross-examination, by Mr. Bakewell.)

Ans. I did.

X Int. 69. Did he read that paper over to you before its publication, and consult you about his statements?

(Same objection by Mr. Bakewell.)

Ans. I do not now remember.

241 X Int. 70. Don't remember of his reading that over, and consulting you about it?

Ans. No, sir.

X Int. 71. In that statement made January 2, 1882, Mr. John Du Bois states: "A dam or gate known as the bear trap was in use, but only in small streams as a gate or dam in a flume, for the purpose of letting off water uniformly; it was reasonably good, but could not be used for passing logs, etc., without letting it clear down. When partially down there was a perpendicular fall from the upper leaf of the gate to the lower one. (See diagram.) In order to obviate this difficulty, I conceived a plan for which I obtained a patent,

bearing date the 2d day of September, 1862. (See diagram.) The lower end of the lower leaf of the gate was firmly hinged to the body of the dam, and the upper end of it firmly hinged to the lower end of the upper leaf. The upper end of the upper leaf was secured to a shaft that moved backwards and forwards as the centre of the gate (the ends of the gate that are hinged together) rises and falls in the act of creating and letting off the head. Each end of the shaft was provided with a journal that moved in a grooved plate in each wall of the frame. As the gate was elevated or depressed, this formed a uniform descent from its extreme height to its level, answering its purpose very well." State whether or not you superintended the mechanical construction as set forth by Mr. John Du Bois in his statement, and whether or not his statement of the object of that construction was his intention in making it?

(Objected to as irrelevant and incompetent by Mr. Bakewell, and improper on cross-examination.)

Ans. From my frequent interviews with Mr. Du Bois on the subject of the bear-trap dam, and from his repeated statements that the third leaf was the thing needed to keep the gates from rising too far, and from the fact that the difficulties arising from an abrupt descent did not appear in practice, I believe he attached (more) very little value to the leaf as a stop than for any other purpose. (See Int. 105.)

X Int. 72. Then, at the time that he published this state-
242 ment in January, 1882, and consulted you about it, did you object to his stating the purpose for which he intended the third leaf?

(Same objection by Mr. Bakewell.)

Ans. I do not now remember.

X Int. 73. Had you much practical experience in driving logs and using these Du Bois bear-trap dams for the use for which they were designed in practice?

A. No, sir.

X Int. 74. Did you often visit the Du Bois bear-trap dams other than the first one you have spoken of after they were once built and out of your charge?

Ans. I visited the dams as often as repairs were needed or an examination required.

X Int. 75. Supposing a plank were off at the dam up at Narrows creek, the big dam; suppose there was a plank off up there, would that be put on by the men up there, or would they send to you to come and put a plank on?

Ans. They should repair an injury of that kind themselves.

X Int. 76. When there was a scarcity of water, and they needed to bulkhead up any of the dam in order to economize the water, would the men in charge do that, or would they send to you to consult you about it?

(Question objected to by Mr. Bakewell, because it supposes a supposition for which there is no warrant in the testimony, and it does

not appear what the counsel means by the expression "to bulkhead up.")

Ans. In time of very low water the men would frequently place boards against the upper side of the dam, fill the crevices with moss, brush and leaves of their own accord and responsibility.

X Int. 77. Would not the cleats at the sides of the dam leaves have the effect of diminishing leakage along the edges of the dam leaves when they were raised up against the cleats?

243 Ans. Not unless the parts were accurately fitted to each other.

X Int. 78. Would they not have a tendency to decrease the leakage in proportion as they were accurately fitted?

(Objected to because the witness has not been examined as an expert.)

Ans. Yes.

X Int. 79. Would not the third leaf have a tendency to keep the lower leaf in place in low stages of water?

(Same objection by Mr. Bakewell.)

Ans. The third leaf is only useful as a stop during high stages of water.

X Int. 80. But not in the highest, as I understand you?

(Same objection.)

Ans. Yes, not in the highest.

X Int. 81. Would the third leaf continue to restrain the flopping over of the lower leaf after any overflow in the flume or under the comb of the dam gate had been drowned out, or would it not?

(Objected to, because the same question has been asked as question 63, and because the witness has not been offered as an expert, and it does not appear that he has ever seen an overflow or escape flume such as is referred to in the question; the question is therefore improper on cross-examination.)

Ans. Well, I am unable to state, having never witnessed an appearance of that kind.

X Int. 82. Would the stop cleats on one of the Du Bois dams prevent the flopping over of the lower leaf after any overflow in the flume or fore bay, or beneath the comb of the dam gates, or the flume or fore bay itself had been drowned out by high water?

Ans. They might on narrow gates.

244 X Int. 83. Would they not on any width of gates until such strain was brought to bear upon the gates as to spring them sufficiently to pass the cleats or stop?

(Same objection by Mr. Bakewell.)

Ans. It would restrain the rising of the gates until the gates were forced by the cleats.

X Int. 84. When you visited any of the Du Bois bear-trap dams after their completion, your attention would only be called to such

portions of the dam structures as were reported to you as defective, would it not?

Ans. I invariably made a general examination to discover all possible defects.

X Int. 85. Have you seen any of those dams since you left there on the first day of January, 1883, to inspect them in detail?

Ans. I paid a hurried visit to the dam known as the Chamber of Commerce dam, in company with a friend and several of Mr. Du Bois' employees, on the 25th of December, 1885.

X Int. 86. Have you visited any of the other dams?

Ans. No.

X Int. 87. When was your attention first called to the question whether or not the walls of the fore bay or flume were all of precisely the same height in the Du Bois dam, and by whom?

Ans. I have no recollection of the precise height being questioned, the only object being to make them high enough and secure enough to prevent any escape of water in any direction, until requested by Mr. Du Bois to make drawings showing an overflow during the early part of 1881.

X Int. 88. Then you have never been back to visit these Du Bois dams since you have been asked to testify as to the height of these flume or fore-bay walls, have you?

Ans. Not since my visit of December 25th, 1885.

X Int. 89. When were you asked by Arthur Kirk, the com-
245 plainant in this case, to make affidavit, or deposition with regard — the matter on which you have now been examined on?

(Objected to as irrelevant, immaterial.)

Ans. Several months ago; I cannot name the precise date.

X Int. 90. Did he then prepare a written affidavit,or deposition which he desired you to swear to covering the matter of your testimony in chief here, and take or send it to you at Verona, Pennsylvania, where you were then employed?

Ans. Mr. Kirk handed me a paper containing a statement of the case, and asked me to give it my consideration, and erase all matter which did not agree with my recollection of the facts of the case, and to add whatever knowledge I had relating to the matter.

X Int. 91. Did you not refuse to swear to that affidavit, and state to Mr. Kirk and to others at the time, that you knew nothing that would be of any use to him or in favor of his side of the case?

(Same objection by Mr. Bakewell.)

Ans. I remember making no such statements, but agreed to give the matter my consideration.

X Int. 92. Did you not decline to make the affidavits that he solicited from you at that time?

Ans. Without careful consideration, and without recalling the case to mind I certainly declined to make affidavit.

X Int. 93. After declining to make those affidavits, or about the time that Mr. Kirk was endeavoring to get you to make them, did

you not make an effort to get Mr. John Du Bois to take you back into his employment?

(Same objection by Mr. Bakewell.)

Ans. No; on the contrary, I declined an offer made to me by Mr. Du Bois, offering me a liberal salary and an interest in the machine-shop business, if I would assume my former relations with him.

246 X Int. 94. State whether or not, about that time you did not make an application to Mr. John Du Bois and to his attorneys, to lend you nearly two-thirds of the value of the property that you then owned in Verona?

(Same objection by Mr. Bakewell.)

Ans. Mr. Du Bois loaned me $1,400, for which I gave in return a first mortgage on my property situated in Verona.

X Int. 95. Did you not request a loan of $2,500 on the same property which was declined, and subsequently only $1,400, given to you because the security would not justify any further amount?

(Same objection by Mr. Bakewell.)

Ans. The property being about that time sold, a mortgage of $1,400 was all that was needed in order to cover purchase-money unpaid, for which a mortgage was given and immediately assumed by the purchaser.

X Int. 96. State when you have been more recently approached by Mr. Kirk, the complainant in this case, to get you to testify here today?

Ans. Mr. Kirk wrote me a short time ago asking me to come to Pittsburgh for this purpose.

X Int. 97. State whether or not you were subpœnaed to attend here today or came voluntarily?

(Objected to as incompetent and immaterial.)

Ans. I have seen no subpœna.

X Int. 98. State what, if any, compensation has been paid you, either to come to Pittsburgh and testify, or to testify here.

Ans. No compensation has been offered here; but if I would go to Pittsburgh, my railroad fare and hotel bills I would expect paid.

X Int. 99. Why did you not go to Pittsburgh?

(Same objection.)

Ans. My partner, C. Alfred Smith, strenuously objected, for the reason that our joint business would suffer serious injury from any absence on my part.

247 X Int. 100. What business are you in now?

(Same objection.)

Ans. I am a member of the firm of Smith & Beugler, trading under the style of the Chicago Fuel Company, and engaged in the sale of coal, wood, &c., and the manufacture of an article known as the kiln-dried pioneer kindler.

X Int. 101. State whether or not you came here to-day voluntarily to testify, or whether you are under any obligations to the complainant so to do.

(Same objection.)

Ans. I came of my own accord, and am under no obligations whatever to any one connected with this case.

Adjourned to 9 o'clock a. m., April 27th.

Mr. Patterson, counsel for the defendant, objects to any adjournment of the testimony such as is above indicated, and gives notice that he will move to strike out the whole of the testimony that has been taken down, for the reason that no portion of it has been taken before W. H. Bradley, clerk of the United States circuit court at Chicago, Ills., who was the examiner appointed to take the testimony of witnesses in the above-entitled case, and that no time has been fixed by said special examiner for the hearing of witnesses and the taking of such testimony as provided for in the equity rules whereunder this testimony is claimed to be taken.

Further, for the reason, that the above unreasonable adjournment is made arbitrarily by complainant's counsel, for the express purpose of detaining defendant's counsel in Chicago, in violation of his express agreement to the contrary.

Mr. Bakewell states that he does not desire to enter into a discussion with the defendant's counsel upon a question of motive in adjourning the deposition, but he desires to resent any imputation that the adjournment is arbitrary or intended to inconvenience defendant's counsel; he further states that when he and defend-
248 ant's counsel went to call upon Mr. Bradley this morning, for the purpose of getting him to take the witness' deposition, Mr. Bradley was out, and in order to save delay it was agreed between counsel that S. W. Burnham, act as special examiner and administer the oath, and that until now, defendant's counsel has made no objection to the manner of taking the deposition, nor to the person before whom it was taken. Complainant's counsel further states that defendant's counsel did not conclude his cross-examination until 5.15 p. m., too late for complainant's counsel to get his intended train for Buffalo; that he wishes to ask the witness some redirect questions made necessary by the cross-examination; that the witness desires to be excused in order that he may go to his wife, whom he says is ill; complainant's counsel further states that he cannot remember having made any promise to defendant's counsel as to the time of taking the deposition, but on the contrary, he believes that he said to defendant's counsel that his direct examination of Mr. Beugler would consume but a short time, and that its completion would depend upon the length of the cross-examination. Mr. Bakewell desires to say that he sincerely regrets having caused any inconvenience to counsel for the defendant, and that he believes the adjournment is unavoidable under the circumstances.

Complainant's counsel desires to give notice that he will proceed with the deposition on the morrow at 9 o'clock before Mr. Bradley.

APRIL 27TH, 1887.

Met pursuant to adjournment.

Present: Mr. Bakewell, on behalf of complainant. No one appeared for defendant. After waiting until 9.45 a. m., Mr. Bakewell began his redirect examination of the witness.

Int. 101½. When you left Mr. John Du Bois' employ in January, 1883, upon what terms were you with him, friendly or otherwise?

Ans. Friendly.

249 Int. 102. State whether or not you have any letter showing this, and if so, produce it?

Ans. I have a letter which I will now proceed to read. The letter is headed: "Office of John Du Bois, manufacturer of lumber. Dry lumber, shingles and lath always in stock. Box shooks made and pine bills cut to order.

DU BOIS, PA., *January* 1, 1883.

E. F. Beugler, Esq.

DEAR SIR: I wish you a happy New Year, and that you may realize all the benefits you anticipate in your change of business. Enclosed you will find my parting present. I trust you will receive it as a testimonial of my esteem and high regard for your friendship, integrity and faithful discharge of duty while in my employ. Should you lack for means to make your business a success, call on me. If from disappointment in your expectations in business, the door will always be open to receive you back. You have built up a fine business here with the means afforded you. Instead of leaving here, I had hoped you would have taken an interest in it and kept up its reputation long after I am done with it, but circumstances over which I could not control has decreed it otherwise. Truly yours,

"JOHN DU BOIS."

Int. 103. How did this letter come into your possession, and in whose handwriting is it?

Ans. It was handed to me by Mr. Du Bois, and is in his handwriting.

Int. 104. What was the present which was mentioned in the letter?

Ans. A $100 bill.

Int. 105. Look at your answer to question 71, and state whether or not you are correctly reported in that answer.

Ans. The words "very little value" should be "more value," as otherwise the meaning is misrepresented; it is simply an error in reporting.

250 Int. 106. How were the walls of the fore bays of dams built as regards the manner of adjusting the plank, up to the time when you left Du Bois on January 1, 1883?

Ans. They were nailed firmly to the frame-work.

Int. 107. State whether or not there were in the fore-bay walls of any of these dams up to that time any loose boards or planks which

were removable to lower the fore-bay wall below the level of the upper pool?

Ans. They were all nailed firmly to place; it never was the practice to remove any boards.

Int. 108. How were the end walls of these fore bays planked?

Ans. To the best of my recollection they were planked vertically. With vertical planks it would be impossible to lower the fore-bay wall by removing one or more plank.

Int. 109. Have you seen the dams at Du Bois when the creek was at high stages of water?

Ans. I have.

Int. 110. State whether or not, during these stages of high water it was the practice while you were at Du Bois to limit the height of water in the fore bay by an overflow which would prevent it from reaching the level of the upper pool?

Ans. None whatever.

Int. 111. What were the drawings to which you refer in answer to cross-interrogatory 87?

Ans. They were drawings made for Mr. Du Bois' patent attorneys.

Int. 112. Look at Du Bois' Exhibit L, entitled in this case, and also marked "Defendant's Exhibit L, Du Bois' application for letters patent (drawing.)" In what respect, if at all, do the drawings you refer to resemble the drawings of this exhibit?

Ans. That exhibit is a copy of my drawing.

Int. 113. State whether or not you have ever heard any
251 conversation between Mr. Arthur Kirk and Mr. John Du Bois on a subject of a relieving device for preventing pressure on the dam leaves.

Ans. I have frequently heard Mr. Kirk urge the use of an overflow or relieving device in order to prevent the gates from rising too high.

Int. 114. What was the date of these conversations, before or after the time when you made the drawing of which Du Bois' Exhibit L is a copy?

Ans. Before.

Int. 115. State whether or not in any conversations, Mr. Kirk said anything to Mr. Du Bois to indicate that he limited his scheme for relieving the pressure of an overflow to any specific location of this overflow?

Ans. No particular location was mentioned, the idea being an outlet or overflow for the purpose of preventing the gates from being forced above their proper level. Mr. Kirk tried to impress on Mr. Du Bois the importance of having this overflow opening. The location which Mr. Kirk told Mr. Du Bois he preferred for the hole was the side wall of the dam, although he told him it could be put in other places.

Int. 116. What did Mr. Du Bois reply to these remarks of Mr. Kirk?

Ans. That he considered an overflow useless for the reason that

the use of the third leaf was entirely sufficient for the purpose of stopping the upward movement of the gates.

Int. 117. State whether or not Mr. Du Bois said anything to indicate that he had any idea of a scheme for allowing water to overflow before it reached the level of the upper pool; I mean overflow from under the gates or from the fore bay?

Ans. None whatever; the whole conversation was to the effect that he had not thought of an overflow, and did not want it.

252 Int. 118. State whether or not, up to the time of your leaving Du Bois, any of the dams were provided with an overflow resembling in any respect the overflow shown in "Du Bois Exhibit L," otherwise marked "Complainant's Exhibit Du Bois' Application for Letters Patent (Drawings)."

Ans. They were not.

Int. 119. After you left Mr. Du Bois in January, 1883, into what business did you go?

Ans. I entered the employment of the Dexter Spring Company of Hulton, Pa., as superintendent of their factory for a term of three years, after which I engaged in my present business in Chicago.

EDWIN F. BEUGLER.

STATE OF ILLINOIS, } ss:
Cook County, }

I, S. W. Burnham, United States commissioner for the northern district of Illinois, special examiner by consent of counsel for both parties, both of whom in my presence agreed that the testimony should be taken before me as special examiner in said cause, do hereby certify that I was attended by Thomas W. Bakewell, solicitor for the complainant, and Mr. T. H. Baird Patterson, solicitor for the defendant, and by the said witness herein named, and that the said witness being of sound mind and of lawful age, was before the commencement of the taking of the deposition by me duly and publicly cautioned and sworn to testify the truth, the whole truth and nothing but the truth, and that the deposition of said witness was reduced by me to writing, and when completed was carefully read over by the witness and subscribed by him in my presence.

I further certify in the said deposition and caption is contained a complete record of all the proceedings before me at the time of taking the same.

I further certify that I am not counsel for either of the parties in said cause, nor am I related in any way to either party or interested in the result thereof.

S. W. BURNHAM,
U. S. Com., Nor. Dist. Ills.

253 UNITED STATES OF AMERICA, }
Northern District of New York, City of } ss:
Buffalo, County of Erie, }

Be it remembered, that on this thirteenth day of May, in the year of our Lord one thousand eight hundred and eighty-seven, I, Charles

B. Germain, an United States commissioner and special examiner, appointed by the United States circuit court, in the western district of Pennsylvania, to take and report testimony in the cause of Arthur Kirk *vs.* John E. Du Bois, above named, did call and cause to be and personally appear before me, at the office of the clerk of the United States district court, in the city of Buffalo, in the said northern district of New York in the State aforesaid, Frederic Augustus Mahan to testify, and the truth to say, on the part and behalf of the complainant in a certain civil cause or matter of controversy, now pending and undetermined in the U. S. circuit court of the United States, for the western district of Pennsylvania, at No. 39 November term, 1886, in equity, wherein Arthur Kirk is complainant, and John E. Du Bois is defendant.

And the said Frederic Augustus Mahan being about the age of — years, and having been by me first cautioned and sworn to testify the truth, the whole truth, and nothing but the truth in the matter of controversy aforesaid, I did carefully examine the said Frederic Augustus Mahan, and he did thereupon depose, testify and say as follows in answer to questions put by Mr. T. W. Bakewell:

Int. 1. State you name, residence and occupation.

Ans. My name is Frederic Augustus Mahan; my residence is Buffalo, N. Y.; and my occupation is captain of engineers U. S. Army.

Int. 2. State whether or not you were present at Du Bois, Pennsylvania, in the latter part of the year 1879, when a party of gentlemen from the Pittsburgh chamber of commerce and others visited that place for the purpose of inspecting a dam of Mr. Du Bois?

254 Ans. I was.

Int. 3. What sort of dam was it?

Ans. A modification of what is known as the bear trap.

Int. 4. What was the purpose of your visit to Du Bois, and what was the object of the meeting?

Ans. The object of the meeting was to examine this improvement or modification invented by Mr. Du Bois. The object of my visit was to see whether this modified form of the bear trap could be advantageously applied to wide spans.

Int. 5. When this dam at Du Bois was raised to its full height, what was the level of the water in the fore-bay chamber as compared with the level of the water in the pool above the dam?

Ans. As nearly as I remember, the level was the same.

Int. 6. State whether or not there was any overflow in the fore bay, by which the level of the water in the fore bay could be prevented from reaching the level of the comb of the dam?

Ans. None that I recall.

Int. 7. State whether or not you remember Mr. Du Bois explaining to you any such overflow?

Ans. I do not.

Int. 8. Did you have any conversation with Mr. Du Bois concerning the construction and the operation of the dam, and did he explain the dam to you?

Ans. He explained the construction of the dam to me at the same time as to the other persons present. I asked him some questions as to how to overcome certain defects which appeared to me to render the structure inapplicable to wide spans.

Int. 9. What was Mr. Du Bois' object, as you understood it, in inviting gentlemen present at that meeting to inspect his dam?

Ans. I do not know. I merely surmise. There was no
255 object stated for the visit; there being, so far as I was informed, an invitation from Mr. Du Bois to see the dam in operation. My idea at the time was that as there was a great deal of opposition to the style of dam at that time under construction in the Ohio river, near Pittsburgh, Mr. Du Bois desired to take advantage of this opposition to have his own style of dam introduced instead of the one under construction.

Int. 10. What was Mr. Du Bois' invention or improvements, you have spoken of?

Ans. To make this clear, I will have first to mention that a bear-trap dam consists of, primarily, two leaves, one known as the up-stream, and the other as the down-stream leaf. These leaves are hinged to the floor of the dam at the upstream and down-stream ends of the respective leaves. When they are lying flat on the floor of the dam, to raise the leaves, the water is introduced underneath them, and the pressure obtained from the fall of the stream is sufficient to cause the leaves to begin to rise. As they rise the level of the upper pool is raised, the pressure on the under side of the leaves increases until they reach their maximum height. It sometimes happens that the pressure of the water from the upper pool forces out the down-stream leaf from under the upstream leaf, thus allowing the dam to collapse by leaving the upstream leaf which forms the breast of the dam, unsupported. Mr. Du Bois' improvement consisted in adding a third leaf, which was hinged to the down-stream end of the upstream leaf in such a way that when the dam was raised the down-stream leaf was supported and held in place by the third leaf.

Int. 11. At what work were you engaged, officially, at the time of the visit to Du Bois, to which you have testified?

Ans. I was assistant engineer on the Ohio River improvement, and in local charge of the construction of the Davis Island lock and dam.

F. A. MAHAN.

256 In the Circuit Court of the United States for the Western District of Pennsylvania, November Term, 1886.

ARTHUR KIRK
vs.
JOHN E. DU BOIS. } No. 39. In Equity.

In open court, on motion of counsel, order granted appointing Charles B. Germain, Esq., a special examiner, to take testimony on part of complainant in the above-entitled cause and report the same to the court.

From the minutes of the circuit court for April 19th, 1887.

In testimony whereof, witness my hand and the seal of said court, this 19th day of April, A. D. 1887.

[SEAL.] H. D. GAMBLE, *Clerk.*

ARTHUR KIRK *vs.* JOHN E. DU BOIS. } In Equity.

John E. Du Bois, defendant, or T. H. Baird Patterson, Esq., his attorney:

Please take notice that we will take testimony on behalf of the complainant in rebuttal in the above-entitled cause on Friday, May 13th, 1887, at 10.30 o'clock a. m. (instead of Saturday, May 7th), before Charles B. Germain, Esq., special examiner, or other competent authority, at the office of the clerk of the U. S. district court, Buffalo, N. Y. You may attend and cross-examine if you desire.

BAKEWELL & KERR,
Attorneys for Complainant.

Pittsburg, May 5, 1887.

CITY OF PITTSBURG, *ss:*

Before me, the undersigned authority, personally appeared John K. Smith, who, being duly sworn, deposes and says that as
257 agent for the complainant above named, on the 5th day of May, 1887, he enclosed a copy of the above notice in an envelope duly stamped and addressed to John E. Du Bois, Du Bois, Clearfield county, Pa., and deposited the same as a registered letter on said 5th day of May, for which he received a registry receipt, hereto attached, and marked "Exhibit Registry Receipt No. 1, J. K. S.," and that in due course of mail he received a receipt for said envelope and enclosure duly signed by the recipient thereof, which receipt is hereto attached and marked "Exhibit Registry Receipt No. 2, J. K. S." Deponent further says, that on the same day, May 5th, 1887, he left a copy of the above notice at the office of T. H. B. Patterson, Esq., No. 139 Fourth avenue, Pittsburg, Pa.

JNO. K. SMITH.

Sworn and subscribed before me, this — day of May, 1887.

W. B. CORWIN,
Notary Public.

[SEAL.]

UNITED STATES OF AMERICA,
Northern District of New York, City of Buffalo, } *ss:*

I, Charles B. Germain, an United States commissioner and special examiner, appointed by order of the circuit court of the United States for the western district of Pennsylvania, to take and report testimony of witnesses and other evidence in the above-entitled cause, do hereby certify that pursuant to my said appointment, and pursuant to the notice annexed hereto, on the 13th day of May, A. D. 1887, I was attended at the office of the clerk of the U. S. district court, at said city of Buffalo, by Thomas W. Bakewell, Esq., repre-

senting the complainant, and by the witness Capt. F. A. Mahan, and the said witness being of sound mind, and by me carefully examined and cautioned, and sworn to testify the truth, the whole truth, and nothing but the truth, and the deposition having been reduced to writing in the presence of the said witness, and
258 after having carefully read the same, the witness subscribed to it in my presence. And I do further certify, that I am not of counsel nor attorney for, nor related to either of the parties in this deposition and caption named, nor am I in any way interested in the event of the cause named in said caption.

Witness my hand, this 13th day of May, 1887.

CHARLES B. GERMAIN,
United States Commissioner and Special Examiner.

PITTSBURG, *April* 29, 1887.

Met pursuant to notice.

Present: T. W. Bakewell, Esq., for complainant. No one appeared for defendant.

ARTHUR KIRK, a witness produced on behalf of complainant in rebuttal, being duly sworn, deposes and says:

Int. 1. State your name, age, residence and occupation.

Ans. Arthur Kirk; age 62 years; residence, Sharpsburg, Pa.; occupation, dealer in explosives.

Int. 2. Are you the complainant in this case?

Ans. Yes, sir.

Int. 3. The sixth claim of your patent in issue in this suit, reads as follows: "A bear-trap dam having a relieving or open sluice extending from under the gates so as to relieve them from unnecessary pressure, substantially as and for the purposes described;" when did you make this invention?

Ans. In the latter part of December, 1879?

Int. 4. State under what circumstances.

Ans. I went with the delegation of the chamber of commerce, December 23, 1879, to Du Bois, Pa., by request of John Du Bois, to examine an improved bear-trap dam but recently constructed by him. The delegation consisted of a number of gentlemen from Pittsburg, and after personal inspection of the dam, it was
259 plain to me that some plan was necessary to lessen the pressure on the gates of the dam. It occurred to me next day to provide an overflow at the height desired to maintain the gates, above which all water should flow away, because I observed that the rising power of the dam was the water under it.

Int. 5. How did you propose to carry this idea into practice?

Ans. I had a great many different ideas about it. I studied it out in a great variety of forms, and anticipating difficulties in a great many of them, I finally gave preference to making an overflow at the desired height from a point under the gates, around the end of the lower gate, and discharging into the lower pool; and also to making the lower end or side of the fore bay lower than the

upper end. I preferred the hole in the end wall of the dam, because it seemed to me to be simpler, and I found it easier to explain to others. I had a number of other plans, for instance, a special chamber at the end of the dam. When I got the idea of an overflow in my head, I soon saw that it could be carried out in a number of ways.

Int. 6. To whom did you first disclose this invention, and when?

Ans. To members of my family on my return from Du Bois, after being there with the Chamber of Commerce delegation. That was in December, 1879.

Int. 7. State whether or not you ever explained this invention to John Du Bois, and if so, when, and under what circumstances?

Ans. I did. I explained it to him first in my office in the early part of 1880, and many times afterwards. I urged him to adopt it on some dams that he was building. He persistently disapproved of it, because he said it wasn't necessary, as this third leaf answered every purpose.

Int. 8. State whether or not Mr. Du Bois ever stated to you,
260 or in any way intimated to you, or gave you to understand, that he had an overflow device, which would accomplish the same result?

Ans. No. He gave me to understand that the thing was altogether new, but he didn't want it because he thought it wasn't necessary in view of his third leaf.

Int. 9. How was the fore bay in the Chamber of Commerce dam constructed, when you saw it in 1879?

Ans. The fore bay was a framed box with an inlet wicket at the upper end, and an outlet wicket at the lower end.

Int. 10. How high were the fore-bay walls compared with each other, and with the height of the upper pool?

Ans. All four walls of the fore bay were of the same height, and above the level of the comb of the dam, when raised to its full height.

Int. 11. State whether you had occasion to visit the Du Bois dams after 1879?

Ans. I visited them many times afterwards.

Int. 12. When?

Ans. Three or four times each year in 1880, 1881 and 1882, and several times since that.

Int. 13. During the years 1880, 1881 and 1882, how were the fore bays of the dams which you visited, constructed?

Ans. They were all made as described in my answers 9 and 10. They were all boarded and nailed up tight, with the *the* lower end of the fore bay as high as the upper end.

Int. 14. How long did you continue to solicit Mr. Du Bois to adopt your improvement?

Ans. April, 1881, when I discovered that he made application for a patent for my invention. I became angry at his duplicity, and made application for a patent. As soon as I discovered that he was making application for a patent for my invention, I telegraphed the Patent Office to withhold action on his application, and as soon as

I could, I got my attorneys to prepare the papers and filed
261 my application. The Patent Office declared an interference in which I was successful.

Int. 15. State whether or not, you have visited any dam on the Du Bois property provided with a sand washout flume like that shown in the Defendant's "Exhibit Model," and if so, describe its arrangement as regards the washout, and its mode of operation.

Ans. On March 11, 1887, I visited and inspected a new dam on the Du Bois property, that is dam No. 5 on "Exhibit Kirk Map," and found it had a chamber or well at the opposite side of the dam from the fore bay, just as shown in Defendant's "Exhibit Model," the upstream end of which was two inches above comb of dam when up to its full height, and the down-stream end of which was 19 inches below the comb of the dam when up to its full height. The lower end wall of the washout flume, and the lower end wall of the fore bay were the same height. When the dam was raised, the water ran out over the lower end wall of both.

Int. 16. State whether you then made any experiment with that dam, and if so, describe it and its results.

Ans. I tried several experiments with the dam, and when the water was running over the comb of the dam when up, about three inches deep, I closed the inlet and outlet wickets, and watched it carefully for 45 minutes, and after it had been up all that time with the inlet wicket closed, more water was wasting away from lower end of fore bay and washout flume than was five minutes after I closed the inlet wicket.

Int. 17. Did the dam go down any during this time?

Ans. It remained at its full height. I may add that I watched the dam 15 minutes more while the inlet gate was closed, during which time the dam remained at its full height, and the water continued to run over the lower end of the fore bay. I then opened the outlet wicket, and the dam immediately went down, and fell in five minutes.

Int. 18. State whether or not, before the time you filed
262 your application, you were in any sense, at any time, in the employ of John Du Bois.

Ans. I never was in the employ of John Du Bois, and never received any compensation from him for anything.

Int. 19. What then induced you to take an interest in Mr. Du Bois' dams?

Ans. Knowing that there was a large amount of minerals in the Allegheny valley, I foresaw that if it was improved, I would have a chance of increasing my sales of powder, and therefore was interested in anything looking to the improvement of the Allegheny river. I thought bear-trap dams were the best for the improvement of this river, and I was anxious to have Mr. Du Bois perfect his dam, and get it introduced. This was the reason why I urged him so to use my overflow device, because I foresaw that without some such device, the dam would not be a success.

Adjourned until April 30, at 11 o'clock, a. m.

PITTSBURG, *April* 30, 1887.

Met pursuant to adjournment.

Present: T. W. Bakewell, Esq., for complainant. No one appeared for the defendant.

Examination of ARTHUR KIRK resumed:

Int. 20. In whose company were you, when you performed the experiment stated in your 16th and 17th answers?

Ans. Mr. T. W. Bakewell's, who is one of my attorneys.

Int 21. How long is it since you have been interested in the subject of dams?

Ans. About ten years, and have given the matter a great deal of thought and attention since that time, and have devised several improvements in navigation.

ARTHUR KIRK.

263 PITTSBURG, *June* 18, 1887.

Met pursuant to notice.

Present: James K. Bakewell, Esq., for complainant, and T. H. B. Patterson, Esq., for defendant.

ARTHUR KIRK recalled for cross-examination:

T. H. B. Patterson, Esq., counsel for defendant, moves to strike out all the foregoing testimony of Arthur Kirk, the complainant in this case, for the reason that the same was taken in the absence of defendant and his counsel, without sufficient legal notice, and after the complainant had formerly been offered as a witness in his own behalf in his case in chief, and withdrawn upon the objection made by defendant's counsel, that he was legally incompetent. Also because the complainant is not a competent witness in his own behalf in this case, because he was a party, and is a party to the things, contracts, rights and choses in action in this case to, and with John Du Bois, now deceased, who died prior to the offering of said Arthur Kirk, on his own behalf as a witness in this cause, and the things, choses in action, rights of said John Du Bois, deceased, have passed by his own act, or by the act of law to John E. Du Bois, the defendant in this suit, who represents said decedent's interest in the subject-matter of controversy, and therefore said Arthur Kirk, complainant, being the surviving party to said subject-matter in controversy is not a competent witness, under the act of 1869, or under any other provision of law as it now exists, as to matters which occurred in the lifetime of the decedent. And also for the further reason, that said testimony, so far as it refers to the declarations or admissions of said John Du Bois in his lifetime, for the reason that said declarations or admissions as testified to are not admissible to impeach the *the* title of the defendant to the subject-matter in controversy derived from said John Du Bois by deed already in evidence. Also for the reason that all of said Kirk's testimony, so far as it relates to what he discovered,
264 or what he now claims to have been the invention which he discovered, is incompetent and inadmissible, for the reason

that all his legal claims to his invention, enforcible in this case, are defined and limited by the language and figures of his patent, wherein all his prior rights, if any, merged. Also for the reason that none of his testimony is admissible, and competent as rebuttal, not being in rebuttal of anything proved by the defendant, and the defendant, by his attorney, here gives notice, that he will move the court to strike out all of said Arthur Kirk's testimony at the proper time, and upon opportunity given in the circuit court.

All the foregoing testimony objected to as irrelevant, incompetent and inadmissible for the reasons set forth in the foregoing motion and notice.

The answers of said Kirk to Ints. 15, 16 and 17 are specially objected to, for the reason that dam No. 5, as to which he *he* is testifying, is no part of the subject-matter in controversy in this case, and for the reason that there was no testimony on behalf of defendant with regard to the leakage experiment that could in any way be the basis of the rebuttal testimony here attempted to be injected by the complainant, and for these reasons, said answers are incompetent, irrelevant and inadmissible as rebuttal.

In answer to the motion made by counsel for defendant, counsel for complainant avers that the statements of fact set forth in the said motion are at variance with the record and the true facts of the case, especially in that the attorney for the defense has had repeated legal notice of the taking of the testimony of the said Arthur Kirk, as is shown by the record. Second, that the attorney for the complainant denies that the said Arthur Kirk was ever offered as a witness and withdrawn on account of, or in view of any objections made by the attorney for defendant; nor does the record show any such offer or objection. That no competent evidence or proof of any contract between the said Arthur Kirk and John Du Bois is contained
265 in the record, but that said contracts are denied by the said Arthur Kirk, as doth appear by the record.

Subject to the foregoing motion, notice and objections to the legality and competency of complainant Kirk's testimony, and not waiving any of the same, nor any other legal objections to the competency of said Arthur Kirk, complainant, as a witness, or to his said testimony, defendant by his attorney T. H. B. Patterson now proceeds to cross-examine said Arthur Kirk, complainant.

X Int. 22. Were you ever offered as a witness in this case before the present examination?

Ans. No.

X Int. 23. During the progress of your case-in-chief, did your counsel, T. W. Bakewell, Esq., call you for the purpose of using you as a witness?

(Objected to as not proper cross-examination.)

Ans. Not as a witness, there was some conversation, but it didn't amount to an offer.

X Int. 24. During that conversation which occurred at that time,

was any question raised or objection made by T. H. B. Patterson, Esq., attorney for defendant as to your competency?

(Objection continued.)

Ans. No, it was merely to the suitableness of the time.

X Int. 25. Was it not as to the suitableness of the time for testing the question as to your competency as a witness?

(Objection continued for the above reason, and for the reason that no such offer appears on the record, which is the best evidence as to the alleged act.)

Ans. I don't know what it was, I am no lawyer; I don't know that the objection was.

X Int. 26. State whether or not in the offices of Bakewell & Kerr, No. 110 Diamond street, Pittsburgh, Pa., before R. H. Whittlesey, notary public, in the matter of interference, movable dams, Arthur Kirk *vs.* John Du Bois, on the 30th day of November, 1881, you testified as follows:

266 "Int. 3. Did, or did you not, make an improvement in what are known as bear-trap dams, and if so, please state when and how you conceived this invention?

Ans. I did; about the 23d of December, 1879, I went with a delegation of the chamber of commerce of Pittsburg, to inspect Mr. Du Bois' dams. I then went to Benezette, Elk county, Pa., to inspect a bear-trap dam that had been in operation, I think, seven years; the man in charge told me they had great trouble with it, by too much pressure under the lower leaf; I then conceived the idea of providing an escape for the surplus pressure. I first thought of doing that by a special chamber at the end of the dam for that purpose, connected with the space under the dam by means of an opening at the bottom of the end wall, but finding that would involve unnecessary expense, I gave the preference to another plan, viz: by actual experiment, find the elevation of water under the dam necessary to support it to the desired height, then by simply cutting an opening at that height between the chamber under the dam, when raised, and the tail race, necessary in all these dams to carry off the water from under the dam, when it was desired to lower the dam; I say, by simply making an opening between these two chambers of the same capacity of the inlet valve, which, when opened permitted the water to get under the dam; I concluded it would be impossible for any damage to be done to the dam, by the carelessness of the tender, or other causes permitting the inlet gate to remain open; I also had an idea of accomplishing the object by means of floats, levers, etc.

Int. 3. At what date had you fully conceived this invention?

Ans. The 25th or 26th of December, 1879."

Ans. I object to the question. I am not here to be cross-examined on all I have ever said. I understand that I am to be examined on the testimony last taken. You might as well cross examine me on what I said 20 years ago.

267 X Int. 27. The last Int. is repeated in the same words, and it is insisted that the witness make a specific answer?

Ans. I decline to answer. You might just as well appeal to the court now to see whether I am to be cross-examined on everything. I may add that I look upon it as the opening question to unnecessarily prolonging this cross-examination.

(In view of the repeated refusal of the complainant, Arthur Kirk, to answer the last two interrogatories which it is submitted are not only proper and pertinent, but exceedingly important, T. H. B. Patterson, the counsel for defendant, requests the examiner to certify this record, including the complainant's last two answers forthwith to the circuit court with a request that he and the witness on the stand be properly instructed as to their duties in the premises, and as to the right of defendant to cross-examine.)

Witness on being instructed by his counsel that he must answer all questions, replies to the last two foregoing questions, Yes.

X Int. 28. Can you give the exact date when you first illustrated your invention by drawings or plans?

Ans. No.

X Int. 29. What became of the first drawing or plan illustrating your so-called invention?

(Objected to as not proper cross-examination.)

Ans. Don't know.

X Int. 30. Did you make any drawing or plan of your so-called invention before you explained it to any one?

(Objection continued.)

Ans. I don't know.

X Int. 31. How long was it after your so-called invention or discovery before you made any drawing or plan illustrating it or showing what it was?

Objection continued.)

Ans. At this time I can't remember.

X Int. 32. Can you remember whether you made any
268 drawing or plan illustrating your invention before you explained it to your son, David M. Kirk?

(Objection continued.)

Ans. I do not remember.

X Int. 33. Did you make any plan or drawing of your invention prior to your first explanation of it to John Du Bois?

(Objection continued.)

Ans. I can't remember.

X Int. 34. Do you remember whether you made any plan or drawing illustrating your so-called invention prior to your first explanation of it to N. G. Ayres?

Ans. I don't remember.

X Int. 35. State as nearly as you can when you made the first plan or drawing illustrating your so-called invention.

(Objection continued.)

Ans. It is now seven or eight years at least since, and I do not remember when.

X Int. 36. To whom did you first disclose your so-called invention, and when?

(Objection continued.)

Ans. I do not remember when or to whom.

X Int. 37. Have you ever constructed any dam for actual use in business that embodied your so-called invention, and if so, when and where?

Ans. No.

X Int. 38. In your preliminary statement, under oath, filed in the interference proceedings in the Patent Office, did you not swear on the 21st day of September, 1881, as follows: "Some time about the first week of January, 1880, about two weeks after my said visit to Benezette, I communicated my idea to John Du Bois in my office in Pittsburg. He however disapproved of the idea, and said that it would not accomplish the object."

And in using that language, were you not speaking of the idea of your so-called invention?

269 (Objection continued.)

Ans. It is so long since I do not remember what connection it was in. I don't remember whether I did so swear or not. The copy is the best evidence; better than my memory.

Recess until 2 p. m.

Met, 2 p. m.

X Int. 39. Did you not in the same preliminary statement under oath, sworn to at the same date, state: "During the year 1880 and the first part of 1881, I explained my invention to my son and to others, and I had repeated interviews with Mr. John Du Bois, and urged him to test my invention. In March or the first part of April, 1881, I wrote to Mr. John Du Bois"?

(Objected to as not proper cross-examination, and for the reason that the answers to the questions are already contained in the record, which is primary evidence as regards these matters. This objection is made to all questions relating to any record in the interference proceedings.)

Ans. I don't recollect dates. I refer you to the record.

X Int. 40. Did you not in the same preliminary statement, under oath, swear at the same date that "on or about the 12th of April, 1881, I visited the residence of Mr. John Du Bois, in Clearfield county, Pa., and while there I learned that Mr. Bois, after receiving my said letter, had filed his application for a patent for relieving the pressure on the gate of the dam, according to my invention"?

Also state whether or not, at that date, you saw Mr. John Du Bois at his residence?

(Objection continued.)

Ans. That is now six years past the 1st of April, and I cannot remember whether I saw him or not.

X Int. 41. Can you recollect whether you saw Mr. John Du Bois in April, 1881, at the time you testify you discovered that he had made application for a patent for your alleged invention?

270 Ans. I cannot remember definitely, but to the best of my recollection, I was there part of two days, on the first day of which Mr. Du Bois had the tracing now in the hands of Mr. Patterson made for me, and just as I was taking the train to leave Du Bois on the afternoon of the second day, I discovered that he had made application for a patent.

X Int. 42. You are now speaking in your last answer of the occasion of your visit to Du Bois in April, 1881.

Ans I so understood your question. This was the time when I discovered that Mr. Du Bois had made application for a patent.

X Int. 43. Was this the same visit to Du Bois of which you speak in your testimony given on the 30th day of November, 1881, before R. H. Whittlesey, notary public, in the office of Bakewell & Kerr, No. 110 Diamond St., in the interference matter which is as follows:

"Int. 27. State how, when and where you made this discovery?

Ans. The first intimation I had of it was when I visited Du Bois, Clearfield county, Pa., on or about the 12th day of April, 1881, and from his general manager, whose name I cannot recall, I found that he had filed an application for a patent covering my invention."

Ans. I think it is the same visit. It looks as if there was some catch in such a question.

X Int. 44. "Kirk Exhibit Tracing, U. S. circuit court W. dist. of Penna., No. 15, May term, 1886," shown witness, and he is asked whether this is the tracing referred to in his answer to X Int. 41, and also for what purpose it was given to him, and by whom the tracing was made?

(Objected to as not proper cross-examination, said drawing not being part of the record.)

Ans. Yes. It was made by E. F. Beugler, and given me by order of John Du Bois, and a clerk by the name of Baird endorsed the letters "John Du Bois' patent dam, scale $\frac{1}{2}$ in. equals 1 foot"

271 on it at the time. It was given to me for the purpose of being able to enable me to talk and explain it intelligently to gentlemen making inquiries about the Du Bois dam, and was understood to embrace all of John Du Bois' improvements (objected to by Mr. Patterson), and from it I was to get a wood engraving made illustrating the John Du Bois improved dam. I got this wood cut made, and John Du Bois paid for it. And neither in the tracing or the wood cut was there any reference to any overflow or relieving device.

(The last part of the answer is objected to as not responsive.)

X Int. 45. Was this tracing given to you in person at the time of your visit above described to Mr. John Du Bois, at Du Bois, and who handed it to you?

(Objection continued.)

Ans. Mr. Du Bois, in my presence, instructed Mr. Beugler to make it, and I was to call at his office at a certain hour and get it, and his book-keeper, Mr. Baird, I think was the name, handed it to me.

X Int. 46. Is not this the same tracing filed by you at No. 15, May term, 1886, Arthur Kirk *vs.* John Du Bois, and is it not the only tracing ever filed by you in that case?

(Objection continued.)

Ans. I have no recollection as to dates, the record will show.

X Int. 47. State to the best of your recollection whether or not this is the only tracing which you ever got from John Du Bois, and whether or not it is not the tracing which you filed at No. 15, May term, 1886, and the only one you filed as having been received from John Du Bois?

Ans. To the best of my recollection it is the only one, and I recognize by tack marks in the corner of it that it was tacked up in the exposition building alongside of John Du Bois' model, and used by Mr. Du Bois and myself in explaining it to others.

272 (The answer, from "I recognize" to the end of the answer, is objected to by Mr. Patterson as not responsive to the question.)

X Int. 48. Did you not swear, in your affidavit made the 8th day of March, 1886, before W. B. Corwin, notary public, and filed as rebuttal in the case of Kirk *vs.* John Du Bois, No. 15 May term, 1886, United States circuit court, western district of Pennsylvania, in reference to this identical tracing, "I further say that the tracing herewith filed, marked 'Complainant's Exhibit Tracing,' was sent to me by Mr. John Du Bois in the latter part of 1880, for the purpose of having a wood cut representing his dam made, and, as I then understood his dam, it is a correct representation of his dam in use at that time."?

(Objected to as not proper cross-examination.)

Ans. I cannot recollect definitely all the particulars about it. We had a great deal of writing and sending back and forwards, and I may have sent it to him with the wood cut to see that it corresponded with the drawing, or something or another of that kind. I refer to the records for any further information.

(The foregoing answer is objected to as an improper answer to the question.)

X Int. 49. The last interrogation is repeated in the same words, and the witness is asked to answer it specifically—yes or no.

(Objected to as not being proper cross-examination, and calling for a mere yes or no so as to cut off any explanatory remarks, it

appearing to be made for the purpose of causing an inference of contradiction between the affidavit and witness' testimony.)

Ans. Yes.

X Int. 50. In your answer to X Int. 44, by E. F. Beugler, do you mean Edwin F. Beugler, examined as a witness in your behalf in this case?

A. Yes.

273 X Int. 51. Do you recollect how long after the visit, with regard to which you testify in answer to Int. 43, it was that you made your first application to the Patent Office?

Ans. As soon as I could reach the first telegraph office at Brookville, which was about four of five hours after I discovered that he was applying for my patent.

(Objected to by Mr. Patterson as not a proper answer to the question.)

Ans. I refer you to the record; I don't remember the date. The record shows that I was there the 12th of April, and the Patent Office record shows when the application was made; I don't remember. I can't recollect dates, but I telegraphed when I first reached a telegraph office after leaving Du Bois, which was at Brookville, Pa.

X Int. 52. What time in the day, on March 11th, 1887, was it that you visited and inspected the new dam on the Du Bois property—that is, "dam No. 5," on "Exhibit Kirk Map"?

Ans. From memorandums in my book, I think it was early in the morning of March 11th. It was early in the day on which we were to take testimony there. When we returned we found them waiting for us there.

X Int. 53. State, if you please, when John Du Bois died, if you know?

Ans. I don't know the date.

X Int. 54. At what time, if at all, prior to the death of John Du Bois, did you commence any suit or proceeding against him in which you alleged any infringement on his part of your patent rights involved in this case?

(Objected to as improper cross-examination, and for the reasons already given.)

Ans. I brought suit against him at No. 15, May term, 1886, in this court, immediately after I met him at the Brookville fair, and as soon as my attorneys could prepare the papers after that.

X Int. 55. State whether or not that suit is still pending, or whether it has been disposed of?

274 (Objected to.)

Ans. I don't know its legal status. I was told that a dead man could not answer a lawsuit. I don't know whether it is dead or living—the records will show.

X Int. 56. State whether or not dam No. 8, "Exhibit Kirk Map," was built prior to the death of John Du Bois?

Ans. I don't know.

X Int. 57. State, if you know, what are the relative rights of John Du Bois and John E. Du Bois in the dam, property, patents and other subject-matter in controversy in this case.

(Objected to as not proper cross-examination.)

Ans. I do not know what their relations are, but I do know that John E. Du Bois is using my invention without paying me for it.

(The last part of the answer is objected to as not responsive to the question.)

X Int. 58. State, then, on what grounds you base the relevancy and competency of your testimony direct, so far as concerns John E. Du Bois, said testimony being all in relation to John Du Bois.

(Objected to on the ground that the witness is not supposed to be the judge of the competency and relevancy of testimony taken by his counsel.)

Ans. I don't understand the question. I don't connect them any more than Edwin F. Beugler with the case.

Adjourned to Tuesday, June 21, at 2 p. m.

PITTSBURG, *June* 27, 1887.

Met pursuant to adjournment.

Present: T. W. Bakewell, Esq., for complainant, and T. H. B. Patterson, Esq., for defendant.

Cross-examination of ARTHUR KIRK resumed:

275 X Int 59. In your answer to X Int. 51 you say, "as soon as I could reach the first telegraph office at Brookville, which was about four or five hours after I discovered that he was applying for my patent." Do you mean by this answer that four or five hours after your conversation with Mr. John Du Bois, deceased, at Du Bois, Pa., you sent a telegram from the telegraph office at Brookville the same day to the Patent Office or Commissioner of Patents?

Ans. Yes.

X Int. 60. State whether or not you have preserved a copy of that telegram, and if so, produce it.

Ans. I can't say whether I have a copy of it or not.

X Int. 61. Did you not state, on the 18th of June, 1887, on your last examination in this office, that you had a copy of that telegram filed away, and that you preserved a copy of all telegrams and letters sent by you in connection with this matter, and had them filed away?

Ans. I had papers of all that, but we have been remodeling our office and destroyed a great many papers, and I don't know where it is.

X Int. 62. Then, do I understand you now to state that you do not know what, if any, copies of telegrams, letters, papers or plans connected with your so-called invention and patent claim in ques-

tion in this case you now have in your possession, custody or control?

(Objected to as irrelevant and improper cross-examination.)

Ans. I do not know what I have. My office was overhauled in my absence, and the papers disturbed and some of them destroyed.

X Int. 63. State whether or not the written notice served by T. H. B. Patterson, attorney of the defendant in this case, on your counsel, W. Bakewell & Sons, on Saturday, June 25th, in the afternoon, requiring you to produce all or copy of all telegrams, letters, plans and papers, in any way relating to or connected with your so-called invention or patent claimed in this case, at this
276 hearing on Monday, June 27, 1887, at 10 o'clock a. m., has been in any way communicated to you; also whether or not, when, and how recently you have made any search for said telegrams hereinbefore referred to, other letters, telegrams, plans or papers such as above referred to?

(Objected to as irrelevant, incompetent.)

Ans. I haven't seen the notice; I heard of it about ten minutes ago. It was some time during the progress of this case, and I think I presented all I could find; but I haven't for some time back.

X Int. 64. The original of the notice served on W. Bakewell & Sons is handed to the witness, complainant, on the stand, said notice being as follows:

"Please take notice that the complainant, Arthur Kirk, is hereby notified and required to produce, before the special examiner, W. B. Corwin, Esq., at your office on Diamond street, Pittsburg, Pa., at 10 o'clock a. m., on Monday, June 27, 1887, at the continuance of his cross-examination, all letters, telegrams, plan and papers in any way relating to or connected with his so-called invention or patent claimed on the improved bear-trap dam, and in question in this suit, whereof he has possession or control."

State whether you are willing to produce letters, telegrams, plans and papers called for in said notice, and if so, how soon?

(Complainant's counsel states that, in his opinion, the notice referred to is incompetent and unauthorized, and that the witness is not bound to respect the same in any way. Complainant's counsel therefore advises the witness to give a negative answer to the question.)

Ans. No.

Counsel for defendant declines to proceed further with the cross-examination until those papers are produced.

Witness states that it is his impression that there is a slight
277 mistake as to dates about the time. My recollection is that I said that I got the tracing in 1881. I think it must have been in 1880.

Complainant's counsel gives notice to Mr. Patterson, the defendant's counsel, that having received notice of an intent on Mr. Patterson's part to take testimony on behalf of the defendant tomorrow at Du Bois, Pa., and on Thursday at Pittsburg, he protests against the taking of any such testimony as unauthorized and unwarranted, and therefore incompetent, and gives notice that at the hearing of the case he will move to have the depositions proposed to be taken stricken from the record, and the costs thereof put upon the defendant.

Mr. Bakewell now asks Mr. Patterson that he produce the "Exhibit Kirk Letters," which were offered in evidence by the defendant and afterwards taken from the record. Mr. Bakewell states that he proposes to make this request the basis for a motion to exclude said letters from evidence. Complainant's counsel have desired to inspect these letters before the closing of the present witness' deposition, but defendant's counsel has not produced them, although requested so to do repeatedly.

In reply to said request and notice, T. H. B. Patterson, attorney for defendant, states that said letters were originally offered and used in the application for preliminary injunction between the complainant and John Du Bois, deceased, at No. 15, May Term, 1886, with the exceptions of Exhibit F, and that also on the motion for preliminary injunction in this case, and were reoffered as exhibits before the examiner in this case on the 19th day of March, 1887, and were left in the custody of the examiner in the office of complainant's counsel from that time until about the last week in April, and the complainant's counsel instructed the examiner to make copies of them to attach to the testimony, so that complainant's counsel has had full access to these papers and full opportunity to inspect them, and the whole of them
278 that were material were actually used upon two arguments, and material portions of them read and commented on, and said access by the complainant and his counsel continued from the spring of 1886 up until the latter part of April, 1887; that immediately after getting these exhibits for the purpose of having them printed, defendant's counsel produced them to his printer, and remains under the impression that he gave them to him with the other testimony for the purpose of being printed for use in this case; that immediately thereafter, or within a few days thereafter, defendant's counsel was taken sick and was absent from his office without intermission for over a month; that after his return he discovered that these exhibits were mislaid or lost; and that since that time he has been making diligent inquiry and search for the same, and will produce them as soon as they are found; that no portion of the examination of the complainant, or of his cross-examination, has had any relation to said exhibit letters; that the said exhibits stand as offered under objection, and are of importance to the defendant's case, whose interests alone are risked or likely to be injured if they are not found.

Complainant's counsel states that he did not make the request for the purpose of charging defendant or his counsel with improper

conduct. The fact is, however, that he does not know the contents of these letters, has no copy of them, and has not been able to see them since commencing complainant's rebutting testimony. If, therefore, there is anything in said letters contained which might have been rebutted or explained, it has been a manifest injury to complainant that the letters have been withheld from his inspection. He therefore protests against the same, and says that whether the letters have been withheld purposely or not, it makes no difference, and that complainant should not be called upon to suffer for the defendant's lack of care.

Counsel for complainant offers in evidence certified copy of the file-wrapper and contents in the matter of the application for
279 Arthur Kirk's letters patent No. 268,411, dated December 5, 1882, this offer being made in pursuance of the notice given at the conclusion of F. W. Ritter's deposition, taken at Washington before Schuyler Duryee, Esq., and the same is marked "Complainant's Exhibit Kirk File-wrapper and Contents."

(Objected to as incompetent and irrelevant, and not proper rebuttal of anything contained in defendant's evidence.)

Counsel for defendant offers in evidence the tracing referred to in X Int. 41 and X Int. 45, of the deposition of Arthur Kirk, and the same is marked "Defendant's Exhibit Kirk Tracing," and more fully described in X Int. 44 and the answer thereto.

ARTHUR KIRK.

PITTSBURG, *April* 30, 1887.

JAMES STEDEFORD, a witness produced on behalf of complainant in rebuttal, being duly sworn, deposes and says in answer to questions propounded by T. W. BAKEWELL, Esq., for the complainant, no one appearing for the defendant.

Int. 1. State your name, age, residence and occupation.

Ans. James Stedeford; age, 53 years; residence, Allegheny, Pa.; occupation, contractor and builder.

Int. 2. Have you ever visited Du Bois, Clearfield county, Pa., and if so, when, and under what circumstances?

Ans. Yes, sir, in December of 1879. I went up to Du Bois at the request of different parties to witness this dam. I went up with the chamber of commerce. I went as a representative of Allegheny councils to visit the Du Bois dams; to view it with reference to the improvement of the Ohio and Allegheny rivers.

Int. 3. What did you do when you reached Du Bois?

280 Ans. We were conveyed from Du Bois in sleds and sleighs to this dam of Mr. Du Bois.

Int. 4. What sort of a dam was it?

Ans. It was styled the Du Bois bear-trap dam.

Int. 5. Look at the model which I show you and state whether or not it represents the style of dam which you saw?

Ans. Yes, that is about the design of it. There are some differences in construction.

Int. 6. What was the height of the fore-bay walls as compared with the level of the water in the pool above the dam?

Ans. All four walls were the same height. They were all higher than the water in the upper pool.

Int. 7. How were the planks of the lower end walls of the fore bay arranged?

Ans. Straight up and down.

Int. 8. How were they fastened?

Ans. They were either nailed or bolted.

Int. 9. How high did the water stand in the fore bay when the dam was up?

Ans. The same height as the water in the upper pool.

Int. 10. State whether or not you heard any mention of an arrangement for allowing the water in the fore bay to overflow, so as to prevent the water under the gates from rising too high?

Ans. No, sir. I didn't hear of any arrangement of that kind.

Int. 11. State whether or not the water flowed over the lower end wall of the fore bay when the dam was up?

Ans. No, sir.

Int. 12. How do you know?

Ans. I went down below the dam at the foot of the fore bay to witness the water and ice coming over the comb of the dam,
281 and if there had been any water coming over the lower end of the fore bay we could not have stood there to witness it. We would have been wet.

Int. 13. Have you any interest in this suit?

Ans. No, sir.

JAMES STEDEFORD.

PITTSBURG, *June* 21, 1887.

Met pursuant to adjournment.

Present: J. K. Bakewell, Esq., for complainant, and T. H. B. Patterson, Esq., for defendant.

JAMES STEDEFORD recalled for cross-examination.

T. H. B. Patterson, counsel for defendant, objects to all the testimony of James Stedeford taken in his direct examination, and moves to strike the same from the record, for the following reasons: Because no notice of the taking of said testimony was legally served either on the defendant or on his counsel; because the notice which is returned as served by mail on T. H. B. Patterson, attorney, was not received by him or by any one authorized to receive same on his behalf, until the 30th day of May; because said testimony is incompetent, irrelevant and not proper rebuttal of anything proven in the defendant's case; and because same in no way relates to the subject-matter in dispute in this case; and his answer to Int. 7 is especially objected to, because it is in contradiction of the other witnesses called on the part of the complainant, and defendant, by his attorney, here gives notice that he will renew this motion to strike out said Stedeford's testimony upon suitable opportunity given in the court, either before or at the hearing.

Subject to the foregoing objections, motion and notice of motion, T. H. B. Patterson, counsel for defendant, not hereby waiving any legal objection to said witness, or to his testimony, proceeds to cross-examine.

X Int. 14. Who first spoke to you about going to Du Bois, at the time of your visit testified in chief?

282 Ans. Mr. Sidney Fuller first spoke to me about it.

X Int. 15. Did the complainant, Arthur Kirk, speak to you about going there?

Ans. He did not, sir.

X Int. 16. How long have you known the complainant, Arthur Kirk?

Ans. I have known Mr. Kirk for 18 or 20 years; maybe longer.

X Int. 17. What have been your relations with Mr. Kirk as to friendship?

Ans. Not particular with him any more than anybody else.

X Int. 18. Do you remember whether Mr. Arthur Kirk was active, or otherwise, in getting up this excursion of the chamber of commerce, in December, 1879?

(Objected to as not proper cross-examination.)

Ans. That I do not know.

X Int. 19. How many persons went up on this excursion?

Ans. I suppose there were from forty to fifty went up on that day. I didn't count them.

X Int. 20. Do you remember what day it was, and what time of the day it was you reached Du Bois?

Ans. I think it was December 24th, 1879. I think we got there between three and four o'clock in the afternoon.

X Int. 21. Do you remember where that excursion took dinner?

Ans. I think we took dinner at New Bethlehem on the road to Du Bois. It was a new road to me. I didn't know the names of the stations.

X Int. 22. How soon after the arrival of the excursion at Du Bois did you go over to the dam that you saw?

Ans. As soon as we were well off the train at Du Bois Station. There were sleighs and sleds waiting for us to convey us to the dam.

283 X Int. 23. How far was it from the hotel or station to the dam that you visited?

Ans. At that time there was no regular hotel in existence at Du Bois, because we boarded at Mr. Du Bois' house; the hotel was not fitted up yet. I think it was about a mile and a quarter to a mile and half from the station.

X Int. 24. Do you remember what kind of a day it was as to coldness—I mean in the evening at Du Bois?

Ans. It was cold.

X Int. 25. Do you remember whether the ground was covered with snow, and also whether the creek was covered with ice, and what was the depth or thickness of the ice or snow?

Ans. The ground was covered with snow from three to five inches

deep, and the creek, where this dam was located, the ice was from three to four inches thick.

X Int. 26. Do you remember the height of the water in the creek, with reference to the banks?

Ans. The depth of the water I did not measure, but according to the location of the creek, the water was nearly level with the banks.

X Int. 27. Were the banks of the creek at the dam of the same height?

Ans. Yes, sir; they were of the same height.

X Int. 28. Look at the Exhibit "Defendant's Model," and state whether the dam you visited on this occasion had any washout flume or model, such as is shown in the model.

Ans. I was not over on that side of the dam at all, and I don't know whether there was any there.

X Int. 29. Were the walls of this fore bay all planked in the same way?

Ans. Yes, sir; I know the outside wall of the fore bay was planked horizontally; I couldn't see the inner side wall on account of the water, as the leaves were up and the ice running over
284 them, but I suppose it was planked the same way. To the best of my recollection, the lower end wall of the fore bay was planked vertically. I couldn't say as to the upper end wall, because the fore bay was full of water and I couldn't see it.

X Int. 30. Was the framing of that dam substantially the same as this model?

Ans. I nor anybody else couldn't tell as to the top of it, because the top was covered with plank, and the sides were closed in by the banks.

X Int. 31. On which side of that dam you visited on this occasion was the fore bay or flume?

Ans. It was on the side of the creek that we approached first; that is, on the side nearest to Du Bois Station.

X Int. 32. You mean on the right-hand side of the creek looking down the creek?

Ans. Yes; on the right-hand side.

X Int. 33. Did you ever before, or have you since that time, visited or examined any other dam than the one you visited with the chamber of commerce excursion that day?

Ans. No, sir; I never did.

X Int. 34. How long did you remain at that dam on that day?

Ans. Possibly we remained there for from three-quarters of an hour to an hour, possibly; I couldn't tell.

X Int. 35. Did you make any examination of that dam excepting while the whole party were there?

Ans. No, sir; I did not. I gave it a careful examination while I was there, though.

X Int. 36. After the party left the dam, where did they go?

Ans. We went back to Du Bois; part of them, I suppose, went to the house, and part went to the mills. I, for one, went to the mills.

X Int. 37. From the mills where did you go?

Ans. To Mr. Du Bois' house.

285 X Int. 38. Where did you get your supper, and where did you spend the evening?

Ans. We got supper at Mr. Du Bois' house and spent the evening there.

X Int. 39. In the evening after supper, were there not resolutions passed and telegraphed to the Pittsburg papers recommending the Du Bois dam for reproduction on the Ohio river, and so forth, by the Government?

(Objected to as not proper cross-examination.)

Ans. There were.

X Int. 40. Was not this whole excursion a public affair gotten up for the purpose of influencing public opinion in favor of the introduction of the Du Bois dam on the Ohio and Allegheny rivers, near Pittsburg?

(Objected to as incompetent, irrelevant and not proper cross-examination.)

Ans. After examining the dam at Du Bois, it was agreed that it would be an improvement on the Ohio and Allegheny rivers to have one of the dams, or more, placed in those streams; Mr. Du Bois agreeing to put in one dam on the Allegheny river at his own expense. Should it not prove successful to the navigation of that stream, he would take it out at his own expense.

X Int. 41. Now, Mr. Stedeford, in point of fact, isn't the right bank of the creek at Du Bois, at the point where you visited this dam was located—I mean the right bank looking down the creek—originally swamp land, and much lower than the left or opposite bank, which is right on the foot of the hill?

(Objected to as incompetent, irrelevant and not proper cross-examination.)

Ans. On the right of the creek there was quite a large space of level land, or table-land, as you call it, but on the left of the creek there was a space of ground level with the right of the creek, before the hill started.

X Int. 42. In point of fact, did not the frame-work of
286 the dam that you visited extended in height at least a foot, or in the neighborhood of a foot, above the edges of the plank which constituted the walls of the fore bay and chute, or gate chamber?

Ans. As far as my recollection bears me out, the timbers that went across this dam stood in the neighborhood of a foot to fourteen inches above the ground; it was quite a step to get up on top of it. The ground was nearly level with the top of the side wall.

X Int. 43. Did the end walls of the fore bay or flume extend as high as the side walls of the fore bay or flume, or were they higher or lower?

Ans. The lower end wall was as high as the side, as I answered before. As to the upper one, I could not say, on account of the water being there. I could not see it.

X Int. 44. Why couldn't you tell the height of the upper end wall of the fore bay and how it was planked?

Ans. Because the top of the dam was covered over with plank, and the side of the dam being sided up nearly level with the ground, so that you could not see the upper end of the fore bay.

X Int. 45. If, as you have testified, the walls of the fore bay were all higher than the water, and the side wall of the fore bay was fourteen inches lower than the plank lying on top of the cross-timbers, and you were making a careful examination of this dam, as you have said you were, what would prevent you seeing the top of the upper end wall of the fore bay, when you approached the dam on the ground at the side and looked into the fore bay?

Ans. Good reason for that; the upper end of this dam here answered similar to a lock on a canal, the water being level in the upper pool and in the fore bay, obstructed the view of this planking in here and kept it from observation.

287 X Int. 46. Then, if your last answer is correct, and you could not see the upper end wall of the fore bay, how did you come to swear, in your answer to Int. 6, in your direct examination—

"X Int. 6. What was the height of the fore-bay walls as compared with the level of the water in the pool above the dam?

"Ans. All four walls were the same height; they were all higher than the water in the upper pools"?

Ans. Because the place was full of water.

X Int. 47. What do you mean by the place?

Ans. This place here, the fore bay, was full of water.

X Int. 48. Then, do I understand — to mean, by your last answer, that the water in the fore bay was higher than the upper end wall of the fore bay?

Ans. No, sir; it was not. It was on a level.

X Int. 49. Then, do I understand you that the water in the fore bay was on a level with the upper end wall of the fore bay, and at the same time that the upper end wall of the fore bay was higher than the water in the upper pool?

Ans. No, sir, I said nothing about the upper end of the fore bay, the planking being higher than the water in the upper pool.

X Int. 50. X Int. 46 is here again repeated to the witness, and he is asked to explain, in view of his last answer, why he swore to said answer to direct Int. 6, as quoted in said X Int.

Ans. You must take into consideration that there are five walls here.

X Int. 51. Then do I understand you to swear now as an explanation that there were five walls to the fore bay on the dam you visited with the chamber of commerce?

Ans. I saw them myself. I saw the five walls, but I took this one here (witness pointing to opposite wall of the gate chamber), as one.

288 X Int. 52. How was the wall at the opposite end of the dam in regard to height, as compared with the side walls of the fore bay?

Ans. They were on a level.

X Int. 53. How far below the upper edges of the side walls was the level of the water in the upper pool, or pool above the dam at the time the party arrived at it?

Ans. The water was level with these walls; the water and ice together.

X Int. 54. Then at that time was the water running over the gates or leaves of the dam?

Ans. I was one of the last of the party that reached the dam, on account of our team balking on the road, and by the time we reached the dam, General White, who was master of ceremonies on that day, had the water running over the dam.

X Int. 55. Wasn't the principal question there with regard to the operation of the dam, wasn't it to see how it would break up the ice and wash it out, and whether or not the action of the water by the inlet wicket above and the outlet wicket below, would not raise the dam and lower it?

Ans. That was the principal thing in examining this dam.

X Int. 56. Was there any discussion there at all, with regard to the height of the wall, or the height of the water, or anything of the kind; that is, was your attention called to that particularly at that visit?

Ans. There was not to my knowledge.

X Int. 57. Did anybody, while you were at the dam, call your attention particularly as to how the plank were arranged, whether horizontally or vertically; was there any thing to call your attention to that particularly?

Ans. I could see the plank on this side that they were horizontal, and by going down to the front end that the plank were standing up and down, perpendicular.

X Int. 58. Was there anything that makes your recollection
289 any more distinct or reliable, with regard to the way in which the plank were arranged, than in regard to the other particulars connected with the dam as to which you have testified?

Ans. No, I don't know that there is.

X Int. 59. Then you are just as liable to be mistaken about the planks on the lower end of the fore bay being vertical, as you are with regard to other particulars to which you have testified about the dam?

Ans. When you can see for yourself when a plank is laid horizontally, and when you can see for yourself that a plank is laid vertically, there is no mistake about that. Any person can see it.

X Int. 60. Your recollection with regard to all the particulars connected with this dam, arises, does it not, from a general examination of it, made while the party from the chamber of commerce was there?

Ans. It was.

X Int. 61. When, Mr. Stedeford, were you first asked, and by whom, as to the arrangement of the plank on the walls of the fore bay of this dam that you have testified in regard to, and the relative heights of these walls?

Ans. The first time that I was asked about it was when I gave my testimony in the office here.

X Int. 62. Did any one speak to you before that?

Ans. No, sir. I didn't know there was anything wrong with it.

JAMES STEDEFORD.

Cross-examination of F. W. Ritter, Jr., on Commission.

Testimony taken on behalf of complainant in rebuttal, pursuant to commission hereto annexed, before Schuyler Duryee, a notary public and commissioner, by order of the court, at the office of F. W. Ritter, Jr., Esq., 920 F street N. W., Washington, District of Columbia, on Thursday, June 29, 1887.

290 F. W. RITTER, JR., being duly sworn, deposes and says, in answer to the cross-interrogatories propounded by Schuyler Duryee, commissioner, as follows:

X Int. 1. State in detail where and in what offices, by whom employed or with whom associated, and during what periods, you prepared for and practiced your professions or occupations, up to the present time.

Ans. My early education was obtained in the public schools of Washington, D. C.; Elmira Academy, Elmira, N. Y.; University of Pennsylvania, Philadelphia, Pa.; and College of Physicians and Surgeons, New York, N. Y. In 1867 I entered the Patent Office, became a member of the examining corps, where I remained until early in 1874. In March, 1874, I resigned from the Patent Office and entered the office of Bakewell & Kerr, counsellors-at-law and solicitors of patents, where I remained in charge of the patent application branch of the business until July, 1879. In July, 1879, I returned to Washington, D. C., and opened an independent office for the prosecution of the patent business, which I have continued to the present time. I graduated from the law department, National University, Washington, D. C., in 1883, and was admitted to the bar of the District of Columbia.

X Int. 2. State particularly what, if any, communication, oral or written, with the complainant, Arthur Kirk, or any one on his behalf, outside of the interrogatories reported by Schuyler Duryee, examiner, you had prior to or since the taking of your testimony by said examiner, May 2d, 1887; and if such a communication was in writing, letter or telegram, please attach same or copies thereof.

Ans. In December, 1886, I was asked by Mr. Thomas W. Bakewell, of firm of Bakewell & Kerr, Pittsburg, Pa., if I would take a retainer as expert in the case of Kirk *vs.* Du Bois. I told him that I remembered the Kirk invention very well, and would take a retainer. Subsequently thereto, in February or March, 1887,

291 Mr. T. W. Bakewell said he would like to have me examine the Du Bois dams at Caledonia and Du Bois, Pa. I agreed to do it when I could find time from my other engagements. This opportunity I found on April 12th, 1887. I arrived in Pittsburg, Pa., on morning of April 12th, and spent the forenoon in consulta-

tion with Mr. Thomas W. Bakewell over Mr. Roberts' and Mr. Reese's testimony, and about 2 p. m. of the 12th left for Du Bois. On the morning of the 13th I visited and examined the dam at Caledonia, Elk county, Pa., and on the afternoon of April 13, '87, I returned to Du Bois and visited and examined the Du Bois dams at that place. On the 14th April I examined a dam at Brookville, and then returned to Pittsburg, Pa. On the night of April 14th I left Pittsburg and returned to Washington, D. C. On this trip from Pittsburg, and until we reached Red Bank on our return, April 14th, Mr. Arthur Kirk was with me, and our talk was largely on the subject of bear-trap dams in general, and his patent No. 268,411 in particular. From that time to the taking of my testimony, May 2d, 1887, I had no conversation with Mr. Kirk, or any one on his behalf, nor any conversation on the subject whatever.

My testimony was taken May 2d, 1887, before Schuyler Duryee, special examiner. Since then I have had no conversation with any one on the subject, except that Mr. Thomas W. Bakewell notified me orally one day, about a week or so ago, when he was in Washington, that a commission had been granted for my cross-examination; and on the 25th June I received a letter from Wm. Bakewell & Sons, saying that they had received a copy of the questions, and desired me to make an early appointment with Mr. Schuyler Duryee to answer. I present original letter, and request examiner to mark it "Ritter letter," and attach to this deposition. I have had no other communication from Mr. Arthur Kirk or his attorneys on the subject. They assisted me and enabled me in getting the facts on which to base my opinion, and then left me to come to my
292 own conclusions. The case seemed too plain to require much consultation, and therefore I did not seek it.

X Int. 3. How long beforehand did you know, and from whom did you learn, the substance of the questions whereon you were examined, as mentioned in last interrogatory, and what, if any, preparation did you make for answering same, and if any such preparation, or notes thereon, were in writing, please attach same or copies thereof?

Ans. I presume you refer to my testimony given May 2d, 1887, as it is the only evidence I have given in this case. I learned the substance of those questions for the first time on May 2d, 1887, when they were propounded to me by Mr. Thomas W. Bakewell, attorney for complainant. The only preparation made was that recited in my former answer, and was a general preparation by making myself familiar with the art in general, and the facts in this particular case.

X Int. 4. State particularly what compensation you have received, or are to receive, for your services in testifying as an expert in this case?

Ans. I have received my usual retainer, and am to receive my usual per diem and expenses. As the compensation does not affect my conclusions or my reasons therefor as given in my direct examination, I respectfully decline to furnish a bill of particulars.

X Int. 5. Disabusing your mind of all bias and interests, disre-

garding all mere printer's paragraphing, and abstaining from taking words out of their proper connection, is not the whole effect of your seven-page answer to interrogatory 7, on your former direct examination, contained in the concluding sentence thereof, viz: "Neither Kirk's claim nor his invention is for a method or principle of operation, but for a definite construction to obtain a given result, and I find in defendant's dam the construction claimed," and is not said definite construction finally claimed and defined by Kirk in his pat-
293 ent, as follows: "What I claim as my invention, and desire to secure by letters patent is '6, a bear-trap dam, having a relieving or open sluice, extending from under the gates, so as to relieve them from unnecessary pressure, substantially as and for the purpose described'"?

Ans. No, sir. The whole effect of my answer is not contained in the concluding sentence quoted in question five. The part quoted must be considered with the context. My answer to question 7, direct examination, is intended to be both an analysis and synthesis of Reese's testimony and Kirk's specification, patent 268,411, and also a statement of the reasons which underlie my conclusions and explain why I differ from Reese, and why I agree with Roberts.

X Int. 6. Is not the only description of said definite construction, a relieving or open sluice, extending from under the gates, as mentioned and referred to in said last interrogatory, contained in the following language, viz: "In the end wall of the dam, I make an open sluice, water-way, or tail race, 38, figure 2, at such height as will permit all water which is not required to sustain the gates, to escape from under them. When the gates are down, as in the position shown in figure 1, the water is admitted by the wickets under them. This raises and floats them up till they reach the position shown by figure 2. By that time the water having reached the sluice, 38, which passes through the wall, around the end of the gate, will flow freely through, sustaining the gates at that level. A modified construction of the sluice, 38, is shown by figure 4, where the outlet, 39, in the wall, is below the level of the water, the latter passing through the outlet, 39, into a fore bay or well, 40, and thence over the bridge, 41. If desired, the discharge opening may be controlled by a valve operated by a float. It is apparent that the form, place and details of construction of the sluice for relieving the gates from excessive pressure below, can be varied by the skilled constructor; but in all cases an open channel will be necessary
294 when the water has reached a certain height or pressure under the gates"?

Ans. Yes, sir. The only description of a definite construction is given in the portion of Kirk's specification quoted in your question. But that is for purposes of description, which is required by § 4888, Revised Statutes, to be a "written description," in such full, clear, concise and exact terms as to enable any person skilled in the art to make and use it, and is not for purposes of limitation. The inventor is thereafter required by the statute to "particularly point out and distinctly claim the part, improvement or combination

which he claims as his invention." And it is this claim which controls the extent of his franchise, not the specific description.

As a matter of general description, see column 1, lines 39 to 44, Kirk's specification (my invention consists,) "fifth, of an open sluice, water-way or tail race, so arranged relatively to the dam that the water which is not required to support the leaves, will escape, and so relieve the dam of all unnecessary pressure."

See also Kirk's specification, column 2, lines 63 and 64: "Figure 4 is a view of one form of the relieving tail race."

And especially note the last clause quoted in your question. All of which, in my opinion, proves that it was the intent of the inventor, Kirk, and the office, that as broad a scope should be given to claim six as was consistent with the state of the art, viz.: "A relieving or open sluice extending from under the gates."

If the open sluice was to extend through the walls, as a matter of limitation it would have been so stated in the claim, or if it was to be a supplemental well on the side of the dam distant from the fore bay, it would have been so stated in the claim, or if it was to be only in the fore bay the claim would have been so worded. And unless each and all these were embraced in the scope and
295 language of the claim, all could not, under the practice of the office, have been retained in the specifications and drawings.

X Int. 7. Is not the only construction substantially described in language quoted in last interrogatory, an open sluice, water-way or tail race, extending from an outlet opening, 38 or 39, in the end wall of the dam by a connecting open channel or well, 40, to a discharge opening, 38 or 41, below and outside the dam, so as to permit all water which must first have been admitted by the wickets under the gates, and which is not required to sustain them, to escape from under them, passing through such outlets so as to relieve them of unnecessary pressure?

Ans. No, sir; two forms of carrying out the invention are described and referred to. One as shown in Fig. 2 of the drawing, wherein the water must first pass from the fore bay into the chamber below the gates, and then out through the port 38—a constant current—where the water "sustains" or floats the gates by its head and flow. This corresponds to Mr. Reese's theory and limitation of the Kirk invention, and if your 7th question was limited to the first part of the quotation (or lines 109–120, Kirk's specification,) I could have answered Yes, and stopped. And a second form with a fore bay or well and overflow, wherein the gates are forced and held up by hydrostatic pressure of the column of water, and where the "water which is not required to support the leaves will escape, and so relieve the dam of all unnecessary pressure." (See Kirk's specification, column 1, lines 41, 42, 43.)

The presence of both these forms shows that the invention is broad enough to cover either.

X Int. 8. Does not the word forebay, in its common acceptance, mean the part of a mill race where the water flows upon the wheel, as

contradistinguished from the water-way or tail race, which is only used where the water is running away, after it has been ap-
296 plied to produce the motion of the wheel, or has done other duty for which used?

Ans. Yes, sir; it means a reservoir or conductor between a mill race and a water wheel, not really a part of the mill race itself, as your question would seem to imply.

X Int. 9. Does not the relieving or open sluice, water-way or tail race, the only overflow described by Kirk's patent, and shown in Fig. 2 and Fig. 4, in both drawings, begin within the dam chamber, at outlets 38 or 39, and end at discharge 38 or 41, without the dam chamber?

Ans. Yes, sir; the relieving or open sluice does in both drawings, Figs. 2 and 4, begin within the dam chamber or under the gates; but in Fig. 2 the overflow is from within the dam chamber, and in Fig. 4 the overflow is without or exterior to the dam chamber. So, from the manner in which your question is worded, I have to answer Yes, sir, as to the place of beginning of the relieving or open sluice, and No, sir, as to the overflow.

X Int. 10. Is it or is it not a fact, that the Du Bois construction, shown in "Exhibit Kirk Sketch," has no open sluice, water-way or tail race, extending out from the gate chamber to the stream below the dam?

Ans. In order to answer this question properly, I should have the "Exhibit Kirk Sketch" before me. This cross-examination is had under a commission, and nearly two months after I last saw the exhibit. The "Exhibit Kirk Sketch" is not attached to the question, and I have no access to it, therefore have to rely entirely on my memory of it.

If the question refers to overflow 38, Fig. 2, of Kirk drawing, patent 268,411, the Du Bois construction shown in "Exhibit Kirk Sketch," to the best of my recollection, does not contain the construction. If the question refers to Fig. 4, of Kirk patent 268411, then the "Exhibit Kirk Sketch," to the best of my recollection, does contain the full equivalent thereof; it, in my opinion, shows an open
297 sluice or water-way extending out from under the gate chamber, to the stream below, at a lower level that the comb of the dam.

X Int. 11. Has the Du Bois construction any open sluice, water-way or tail race, extending out from the chamber under the dam leaves down to the stream below, and having the function of carrying out from the gate chamber water not required to support the gates, and which has been previously admitted into said gate chamber?

Ans. Du Bois has an open sluice, water-way or tail race, extending out from the chamber under the dam leaves, down to the stream below, and having the function (when the dam is to be lowered) of carrying out from the gate chamber water not required to support the gates, and which has been previously admitted into said gate chamber (to raise the gates). My answer is, therefore, yes. Moreover, it has an open sluice, water-way or tail race extending out

from the chamber under the leaves down to the stream below, because the lower end of the fore bay is lower than the comb of the dam, and relieves the dam of the unnecessary pressure. For which further reason my answer is, Yes. But if your question is intended to mean, does all the water which sustains the gates flow through the chamber below the gates, I answer, No.

X Int. 12. Is it or is it not a function of the Du Bois construction, to admit only sufficient water under the gates to elevate them to, and maintain them at a desired height, thus totally preventing the admission of any more water under the gates than is required for such purpose?

Ans. Substantially, yes; and Du Bois accomplishes this by an overflow at the lower end of the fore bay, allowing the water not required to support the gates to escape into the tail race, and this is but one form of the relieving tail race for maintaining the column of water at the height which will support the gates and relieve them of unnecessary pressure.

298 X Int. 13. Does Kirk's construction prevent any water being admitted under the leaves of the dam, except that required to elevate and maintain them at the point desired, and if so, why does he speak of a relieving or open sluice extending out from under the gates, so as to relieve them from unnecessary pressure, by permitting all water which is not required to sustain the gates to escape from under them, if there is no excess of water or pressure under the gates, and consequently no necessity of relieving the gates from an excess that does not exist?

Ans. One form or method shown by Kirk for applying his invention, viz: Fig. 2 and description, page 2, column 2, lines 109–121, does not; on the contrary all the water flows through the dam chamber beneath the gates. The other form or method of application shown in Fig. 4, and described page 2, column 2, lines 122–126, including the fore bay, does prevent any water being admitted under the leaves of the dam, except that required to elevate and maintain them at the desired point, etc.

The language used in the latter part of your question: "By permitting all water which is not required to sustain the gates to escape from under them," is selected from the description, Kirk's specification, page 2, column 2, lines 111 and 112, relating especially to the one form shown in Fig. 2 of the drawings, and is appropriate and literally true.

This language, in a broader sense, is also true, in this: That before an unnecessary pressure can exist in the dam chamber beneath the gates, an excess of water (height of column), must occur, and no matter what produces it, there must then be a relieving or open sluice to permit said excess of water to escape from under them—the gates.

The language of the Kirk specification which applies to the form shown in Fig. 4, Kirk's patent, and to defendant's devices, is found following the description of Fig. 4, page 2, column 2, line-

299 132 *et seq.*, and is as follows: "But in all cases an open channel will be necessary when the water has reached a certain

height or pressure under the gates," and on page 1, lines 39 *et seq.*: "An open sluice, water-way or tail race so arranged, relatively to the dam, that the water which is not required to support the leaves will escape, and so relieve the dam of all unnecessary pressure."

X Int. 14. Is it, or is it not, a fact that the function of the Du Bois construction is different from the function of the open sluice, water-way or tail race of the Kirk patent, and that the only similarity in regard to their operation is that the same effect or result may be produced by each.

Ans. It is not a fact. The function or duty is the same in the Du Bois and Kirk construction shown in figure 4. The function, office or duty is the same in Du Bois' construction and Kirk construction shown in figure 2, and the means is the same, "a relieving or open sluice extending from under the gate."

But as between figure 2, of Kirk patent and Du Bois' construction "it is apparent that the form, place and details of construction of the sluice for relieving the gates from excessive pressure below * * * has been varied by the skilled constructor," to the extent of selecting and arranging the form illustrated in figure 4 of Kirk, viz., controlling the height of column and pressure without the dam chamber rather than within. And it is also apparent that in performing this function in Kirk's devices, figure 2, all the water flows through the dam chamber beneath the gates, while in Du Bois' construction and in Kirk figure 4, it does not.

The function remains the same, the result the same, the means the same, but the change in the position of the overflow causes the head of the column in Fig. 2 to be controlled within the dam chamber beneath the gates, and in Fig. 4 and Du Bois' con-
300 struction, to be controlled in the fore bay. In order to shorten a piece of rope, it is immaterial which end you cut off, the rope will be equally shortened.

X Int. 15. Is it or is it not a fact, that the height of the column of water in the gate chamber of every bear-trap dam is always, on account of their construction, of necessity lower than the height of the water in the pool above?

Ans. Yes.

X Int. 16. Do you understand the Kirk patent to cover any bear-trap dam in which the water escapes past the gates without entering beneath the same, and the escapage of the water is not out of the gate chamber into the stream below, but only from the pool above through a fore bay, whose lower wall is lower than the comb of the dam.

Ans. This is too general a question to be answered intelligently. If it is a hypothetical question, intended to embrace the Du Bois dam, my answer is, Yes.

If the idea of a communication between the fore bay and the dam chamber beneath the gates—or, in other words, a relieving or open sluice extending from under the gates—is intentionally excluded by use of the words, "in which the water escapes past the gates without entering beneath the same," then my answer is, No, for there must be

an open sluice, with an overflow arranged so as to control the height of the column of water in the dam chamber beneath the gates.

X Int. 17. Then in order to produce the Kirk invention it is simply necessary to lower the lower end wall of the fore bay, by removing a plank or two? Am I correct?

Ans. Yes, sir, subject to the qualification of the preceding answer.

X Int. 18. Does Kirk describe this easy mode of producing the invention in his patent, and is it not better than the construction he does describe?

Ans. He does not literally describe it in his specification, but his illustration, figure 4 of patent, and his general description
301 given, are sufficient, in my opinion, to enable any person skilled in the art to which the invention appertains, to make and use the same, by the exercise of good judgment and ordinary intelligence, and without the exercise of the inventive faculty.

In my opinion it is better in some respects, and not so good in others. For reasons, see my answer to direct question 7, page 73, printed record, testimony taken May 2d, 1887.

X Int. 19. Is it, or is it not true, that if the well is dispensed with, and a fore bay used in the same place, the construction ceases to have the function of an open sluice, water-way or tail race, relieving excessive pressure under the gates, by carrying off from under them the excess of water which was previously admitted under them?

Ans. I am not sure that I understand this question. If I do, the fore bay and the well are substantial equivalents, and operate alike to all intents and purposes, the difference being in place or location; the function of an open sluice exists in both, as in figure 4 of Kirk's patent, but is a modification of figure 2 of Kirk's patent.

It is to be noted that if a well is used in addition to a fore bay, and at the opposite side of the dam, the current will flow through the dam, in a measure like figure 2 of Kirk's patent, but the height of the column and pressure in the dam chamber beneath the gates will depend on the position of the overflow, as in figure 4 of the Kirk patent, and in the Du Bois construction.

X Int. 20. Is it, or is it not true, that if a fore bay is used instead of the well, the dam is then not provided with a relieving sluice to carry off water out from under the leaves, but with a device for supplying only sufficient water to the dam chamber to elevate and maintain the leaves at the height desired?

Ans. It is not true any more than it would be to say that
302 your pocket had an opening through which to put your purse in your pocket, but no opening through which to take your purse out of your pocket.

In the "Exhibit Kirk Sketch" the open water-way, M, serves as an open sluice to permit the water from the fore bay to enter the dam chamber below the gates until the gates are raised and the column of water under the gates stands at the height of the overflow at the tail end of the fore bay. Then any excess of water under the gate will escape from the chamber back into the fore bay, etc. The open water-way from the fore bay to the chamber below the gates is, first,

an open charging sluice, and then, when required and in conjunction with the overflow, a relieving sluice to carry off water from under the gates.

To illustrate my answer we will suppose that we take the Du Bois dam, "Exhibit Kirk Sketch," and put in the adjustable or removable boards at the tail of the fore bay, until the overflow is equal to or above the comb of the dam. We now open the inlet wicket, admit the water from the pool to the fore bay, thence by open water-way, M, into the chamber below the gates and obtain a column of water in the chamber beneath the gates which sustains said gates at their greatest height, and produces an unnecessary pressure on the gates. Next we remove the adjustable boards at the tail end of the fore bay until the overflow is two feet below the comb of the dam. As a result, the column of water in the fore bay falls to the height of the overflow. The column of water under the gates falls to the same height, because the columns communicate through open water-way, M. What has become of the surplus water in the gate chamber under the gate leaves? It has passed from under the gates out into the fore bay, and over the lower end of the fore bay into the tail race. Consequently there must have been a relieving sluice to carry off water from under the leaves—surplus water—which created unnecessary pressure. "A relieving or open sluice extending from under the gates to relieve them from unnecessary pressure."

303 X Int. 21. Is not the language quoted by you from the file-wrapper and contents of the Du Bois patent 251,771, as a broad disclaimer, really a qualified disclaimer, followed immediately by claims to a specific construction, including the construction used in the Du Bois dam, as shown by the following quotation showing said disclaimer in its proper connection:

"I do not claim, broadly, herein the combination, with a flexible dam or gate, of an overflow by which the water can escape after reaching a fixed limit of elevation, the same constituting the subject-matter of a prior application.

Having thus described my invention, what I claim is:

1. In combination with a flexible dam or gate, having means for conducting and maintaining water thereunder, an overflow or discharge to limit the head of the water, located at a point in advance of the gate, whereby the surplus water is permitted to escape before reaching the gate.

2. The combination of a jointed or flexible gate, elevated by the admission of water thereunder, and a vertically adjustable outlet to limit the head of the water, acting beneath the gate or dam, whereby the gate may be caused to stop automatically at any desired height.

3. In combination with the flexible dam, the flume, B, and wickets, *f*, a discharge or overflow chamber, *h*, arranged in connection with the flume, substantially as shown.

4. In combination with the dam, A, flume, B, and means for retaining a head of water in the flume and beneath the dam, the overflow chamber, *h*, provided with removable boards, *i*"?

Ans. No, sir. In my opinion, and as I understand language and

the practice of the Patent Office, it is not a qualified disclaimer. It is a broad disclaimer. It is an exact statement agreed upon by the Patent Office and Du Bois as defining the scope and extent of the matter in interference between the parties, and to which the prior inventor was entitled, in view of the state of the art. It is a re-
304 statement of the sixth claim of Kirk's patent No. 268,411, made a part of the record of Du Bois' patent No. 251,771, in order that, as the office puts it, "no misunderstanding may exist should the other case go to patent."

Du Bois had already made a qualified disclaimer, see page 1, column 1, lines 29 to 35, Du Bois patent, No. 251,771. "My invention in this regard, is restricted to an arrangement wherein the head of the water is regulated before it passes beneath the gate or dam, as contradistinguished from a system wherein the water is first passed beneath the dam or gate and then permitted to escape through a safety outlet, etc."

Also, last line, page 1, column 2, *et seq.*, Du Bois specification, yet—

"I am aware that an attempt has been made to protect gates of the class herein described, from excess presure by providing at a suitable elevation an outlet or waste opening, through which the surplus water can escape from beneath the gate after it has reached the desired limit of elevation, and this plan I do not claim." But this qualified disclaimer was not satisfactory to the Patent Office, because it might lead to some misunderstanding in the future. A broad disclaimer was required, viz: the one quoted in your question.

This broad disclaimer was then followed by claims to a specific construction, but I am not satisfied that that specific construction claimed does include, or was intended to include, the construction of the Du Bois dam, as the overflow shown in Du Bois' patent, No. 251, 771 is differently located from that in the Du Bois dams, and the language of the claims in the Du Bois patent, No. 251,771 is peculiar, viz: "An overflow or discharge located at a point in advance of the gate." (See column 1.)

X Int. 22. Have the foregoing interrogatories only been communicated to you and answered by you one at a time, in order as numbered?

Ans. Yes.

F. W. RITTER, JR.

305 *Cross-examination of Edwin F. Beugler on Commission.*

And now, June 25th, 1887, T. H. B. Patterson, attorney of above-named defendant, continues his motion heretofore made, to strike out the testimony of Edwin F. Beugler, taken on behalf of the complainant, and extends his said motion to include the testimony of said witness taken on April 27, 1887, for the reasons that none of said testimony is competent as, and when taken as same, is not proper rebuttal of any of defendant's testimony, and that the matters attempted to be proved are incompetent and irrelevant so for as the defendant in this case is concerned, and also because no part

of same was taken after due legal notice, and before a properly authorized examiner, so as in any way to affect defendant's right to objection.

T. H. B. PATTERSON,
Attorney of John E. Du Bois.

And now, June 25th, 1887, reserving all rights of objections as to competency, relevancy and impropriety as rebuttal, and giving notice that above motion will be renewed in court on the testimony of Edwin F. Beugler, heretofore taken, being filed, defendant files the following cross-interrogatories:

EXHIBIT "A."

KIRK
vs.
DU BOIS.

HULTON, PA., *January* 22, 1886.

Mr. T. H. B. Patterson.

DEAR SIR: I called at your office today, but failed to find you. Mr. Du Bois wrote me a few days ago and seemed a trifle surprised at not hearing from you in regard to my loan. I enclosed your postal, with my reply, in order that he might understand the cause of the delay in the matter, but have not since heard from him.

He was not feeling well at the time he wrote me, and it is quite possible that he is too ill to either come or write.

Owing to the different arrangements which have been
306 made, it will be necessary to borrow but fourteen hundred dollars, instead of the larger amount first asked for, and if you will therefore make out the proper papers for that amount, I will call at any time you may designate and sign them.

The sooner this can be conveniently done, the better, as my stay with the Dexter Spring Company is somewhat limited. Hoping to hear from you soon, I remain,

Very truly yours, E. F. BEUGLER.

EXHIBIT "B."

KIRK
vs.
DU BOIS.

HULTON, PA., *January* 16, 1885.

Mr. Patterson.

DEAR SIR: Your postal received. I called at your office yesterday, but you were out.

Mr. Duncan informed me that there would be no trouble as far as you were concerned to secure a loan of $1,400, that being as much as he would need. This amount, together with what cash he will raise, will enable him to pay the present mortgage and pay me the balance due, $2,300, the price agreed upon being $3,300.

I believe the better way would be for Mr. Du Bois to loan me $1,400, say for three or five years, and then sell to Duncan, letting him assume the mortgage.

This is in accordance with Mr. Duncan's suggestion, and would not meet Mr. Du Bois' views as well as if I had not sold, or did not intend to. Mr. Du Bois writes me by this mail to ask why you have not written him in relation to the matter.

He has been ill, but thinks he will be well enough to come down next week.

307 I will write him this p. m. and explain the cause of the delay as well as I can.

I will call about Tuesday.

Very truly, E. F. BEUGLER.

EXHIBIT "C."

KIRK
vs.
DU BOIS.

HULTON, PA., *February* 6, 1886.

MR. T. H. B. Patterson.

DEAR SIR: Upon my return home I found the "Kirk" paper in my desk where I had placed it. I mail it today.

Mr. Grier says his plan of lots is recorded, but he is unable to say when.

Mr. Meeds, of the Dollar bank, can tell you all about the matter.

Very truly, E. F. BEUGLER.

Cross-interrogatories Propounded to Edwin F. Beugler by the Commissioner, Subject to all Legal Objections to his Former Testimony.

BUFFALO, *July* 13, 1887.

X Int. 1. State if the attached letters, "Exhibits A, B, and C," were written by you, and if so, to what transactions and conversations do they refer; also what was the exact character and contents of the "Kirk" paper mentioned in letter "C," and to whom you mailed same, and what statements in regard to same you made in the letter enclosing same.

Ans. To the first cross-interrogatory he saith: That the letters were written by me ("Exhibits A, B, and C"). They refer to a loan to be made to me by John Du Bois, and to a sale of my property in Hulton, Pa., to Mr. Duncan. Cannot state the exact contents of the "Kirk" papers mentioned in "Exhibit C." It referred to

308 some events of which I had no recollection at that time, neither do I now remember to whom I mailed the paper, or as to what statements were made in the lettter enclosing same.

X Int. 2. State if said letter does, or does not, refer to a preceding letter or conversation with T. H. B. Patterson in which you stated "that Arthur Kirk, the complainant, had been annoying you to get you to testify or make in his behalf, in his suit about the dam pat-

ents then pending against John Du Bois, now dead, and that he had sent you a written affidavit which he insisted that you should make, but that you knew nothing that would be of any use to him; and therefore refused to make said affidavit, and would return same"?

Ans. To the second cross-interrogatory he saith: That I have no recollection of a preceding letter or conversation with T. H. B. Patterson, but about the latter part of January, 1886, was requested by Arthur Kirk to make affidavit to the fact that he at one time visited Du Bois and saw me making a drawing for use of the patent attorney of John Du Bois, said drawing embodying Kirk's invention. I declined to make such an affidavit for the reason that it was a circumstance of which I had no recollection.

X Int. 3. State whether in the latter part of 1880, or in April, 1881, you made a "tracing" of a Du Bois dam for Arthur Kirk, the complainant; also whether James C. Beard assisted you in making same, which was handed to Arthur Kirk, at Du Bois, by order of John Du Bois, deceased? State particularly the date and what conversation then occurred, giving exact words used and names of all persons present?

Ans. To the third cross-interrogatory he saith: That I have no recollection of making a tracing of a Du Bois dam for Arthur Kirk, for the reason that numerous tracings were called for, for the use of the men who were constructing the various dams at that time. Mr. Beard's assistance was confined to the occasional lettering
309 and figuring of the tracings made by me; neither do I remember the fact of any tracing being handed by John Du Bois to Arthur Kirk, or conversation relating to the same.

X Int. 4. State the exact dates and exact words, as nearly as you can, of any conversations between Kirk and John Du Bois, deceased, about the dam and Kirk's so-called invention.

Ans. To the fourth cross-interrogatory he saith: I cannot state the exact dates or words of any conversation between John Du Bois and Arthur Kirk about the dam, but remember that Kirk urged Du Bois to adopt his overflow device, to which Du Bois objected, stating that the float to operate the wickets, the third leaf and the strips or stops secured to the side walls, were entirely sufficient to prevent the gates from rising above their proper height.

X Int. 5. State the exact locations of any and all dams built by, or examined by you on the Du Bois property prior to January, 1883; also state particularly whether the fore bays in each of said dams were on the right or left of the stream, looking down.

Ans. To the fifth cross-interrogatory he saith: That to the best of my recollection the Du Bois patent dams built on the Du Bois property, prior to January, 1883, are located as follows: The "Chamber of Commerce" dam; one at the lower end of mill pond; one near railroad, above the farm-house; one or two on Narrows creek; one at the Tunnel dam, and other small ones which I cannot now locate. The greater number of the Du Bois dams were built with the fore bays on the right-hand side of the stream, looking down.

X Int. 6. State what, if any, communication of any kind you have received from the complainant or any person on his behalf,

since your former examination, and up to the time of answering this interrogatory.

Ans. To the sixth cross-interrogatory he saith: That nearly
310 two weeks after my examination at Chicago, Arthur Kirk wrote to me, saying that T. H. B. Patterson could not be found, and requesting me to call at the Atlantic hotel and see what had become of him. Another letter written in reply to one from me, enclosing a recommendation regarding my qualities as a mechanic; a third and last one notifying me to appear before the examiner, at Chicago, and answer further questions, relating to the present case; also one from Mr. Kirk's attorneys regarding certain dates, which I was unable to give.

EDWIN F. BEUGLER.

Sworn to and subscribed before me, at the city of Buffalo, N. Y. this 13th day of July, 1887.

JOSEPH G. HIRSHBECK,
Special Commissioner.

Counsel for complainant objects to cross-interrogatory 4 accompanying the commission to take the testimony of Frederic W. Ritter, Jr., for the reason that said interrogatory contains matter irrelevant, incompetent and immaterial to the issues of the cause.

Complainant's counsel further objects to the cross-interrogatories accompanying the commission to take the deposition of E. F. Beugler, for the same reasons.

W. BAKEWELL & SONS,
Counsel for Complainant.

Pittsburg, July 2, 1887.

314 APPENDIX.

Complainant's Patent.

UNITED STATES PATENT OFFICE.

ARTHUR KIRK, of Sharpsburg, Pa.

Movable Dams.

Specification forming part of Letters Patent No. 268,411, dated December 5, 1882. Application filed May 31, 1881. (No model.)

To all whom it may concern:

Be it known that I, Arthur Kirk, of Sharpsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful improvement in movable dams; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to improvements in the construction of movable dams and locks, whereby they are stronger, safer, more durable and more easily operated than those heretofore in use. By my improvements, defects heretofore existing in the old bear-trap plan are overcome.

My invention consists, first, in constructing the foundation with several floors having intervening spaces, which are divided into compartments by partitions of any desired height formed by boards laid alternately at an angle to each other, so arranged as to cross at intervals, and then fitting the spaces between the boards with cement and the compartments with sand, gravel, stone, or
315 other suitable material; second, in extending the ends of the top floor several feet beyond the foundation to protect the latter from percolation or wash of the water, which undercuts the foundation; third, of an improved dam gate consisting of a double journal or pintle bolted to one part, with each journal working in one end of a double-ended sleeve on the other part, the said parts being respectively bolted to the gate or foundation, and each pintle works in the adjoining ends of two sleeves, so that as long a hinge as is desired is made by simply adding duplicates of the parts named; fourth, of a rising gate or gates provided with a telescoping joint, which, permitting a limited movement, will enable the gates to accommodate themselves to any unequal settling of the foundation; fifth, of an open sluice, water-way or tail race, so arranged relatively to the dam that the water which is not required to support the leaves will escape, and so relieve the dam of all unnecessary pressure; sixth, in supports or props hinged to the foundation, under the gates, for use in supporting the gates in case of repairs; seventh, in operating the wickets by levers connected to pistons actuated by hydraulic, air, or steam pressure supplied from and controlled at a common point; eighth, in a moving signal connected to the rising gate, and so arranged as to indicate the elevation of the dam; ninth, in use of wooden screws in those parts ex-

posed to water; and finally, in details of construction hereinafter set forth.

To enable others skilled in the art to make and use my invention, I will now describe the same by reference to the accompanying drawings, (three sheets) in which—

(Here follow diagrams marked pp. 311, 312, & 313.)

Figure 1 is a vertical cross-section of the dam and foundation, the gates being down. Fig. 2 is a like view of the gates when up. Fig. 3 is a detail view, illustrating the construction of the foundation. Fig. 4 is a view of one form of the relieving tail race. Fig. 5 is a section of a portion of one of the gates, showing the telescoping joint and the water-tight joint between the end of the dam
316 and the abutment. Fig. 6 shows the use of the wooden screws in the construction of the gates. Figs. 7 and 8 are sectional views of the gate hinge. Fig. 9 illustrates the manner of operating the wickets from one point by steam, air, gaseous, or water pressure. Fig. 10 is a view of the signalling apparatus.

Like letters of reference indicate like parts in each.

The foundation 1, the gates 2 and 3, and lower wall, 4, are made of boards or planks of wood (or sheets of iron) in longitudinal and transverse courses 5 and 6, of irregular length and width, so that the boards of each longitudinal or transverse course shall break joint with those of other longitudinal or transverse courses. This construction does away with the necessity of preparing the timber to any particular size or shape, and makes a stronger and more compact structure than can be obtained in the use of solid cut timber.

The foundation 1 is constructed of several distinct floors. 7, 8 and 9. The first floor, 7, rests on the transverse timbers 10, and is composed of three or more longitudinal and transverse courses of boards, 5 and 6. Above the floor 7 are a number of compartments, 11, of any desired size, formed by partitions 12, made of boards or planks 13, 14, Fig. 3, crossing each other at intervals and piled to any desired height to form pens. The spaces 15 left between the parallel boards by the lateral ones are filled or closed with cement to make them water-tight, and then the compartments 11 are filled with stones, gravel, sand, or other heavy material. The second floor, 8, is similar in construction to floor 7, and covers the compartments 11. Above it other compartments, 16, similar to compartments 11, are formed by building the partitions 12 up to the desired height. The spaces 15 are then closed with cement and the compartments filled with stone or other suitable material, the same as compartments 11.

The third or top floor, 9, is made in the same way as the
317 floors 7 and 8, but preferably thicker, and with the ends extended beyond the substructure, up and down stream, as at 61, to prevent the foundation being damaged by the percolation or reaction of the water into and through it, which might occur if the wash or waves struck immediately against the substructure.

(No Model.) 3 Sheets—Sheet 3.

A. KIRK.

MOVABLE DAM.

No. 268,411. Patented Dec. 5, 1882.

No. 240 DuBois v. Kirk & No. 259 Kirk v. DuBois } p. 311

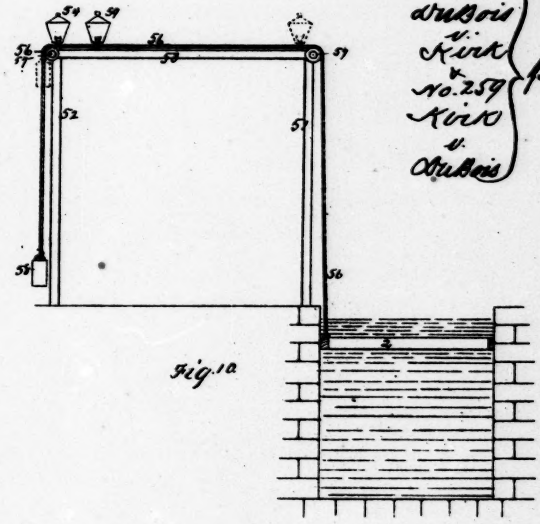


Fig. 10

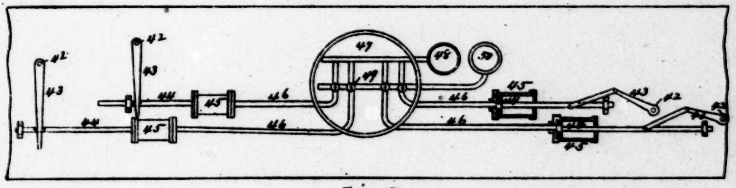


Fig. 9.

Witnesses.
Jno. W. Smith
L. C. Fitler.

Inventor.
Arthur Kirk
by Bakewell & Church
Attorneys

(No Model.) 3 Sheets—Sheet 2.

A. KIRK.

MOVABLE DAM.

No. 268,411. Patented Dec. 5, 1882.

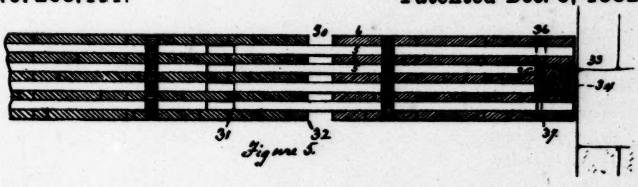


Figure 5.

Figure 6.

No. 240
DuBois
v.
Kirk
&
No. 259.
Kirk
v.
DuBois
p. 312

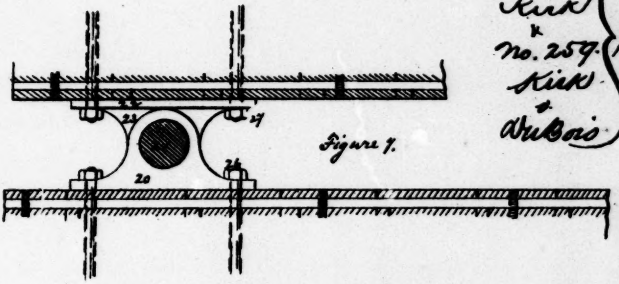


Figure 7.

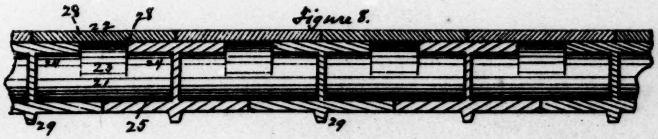


Figure 8.

Witnesses.
Jno. Wesmith
L. C. Fitler.

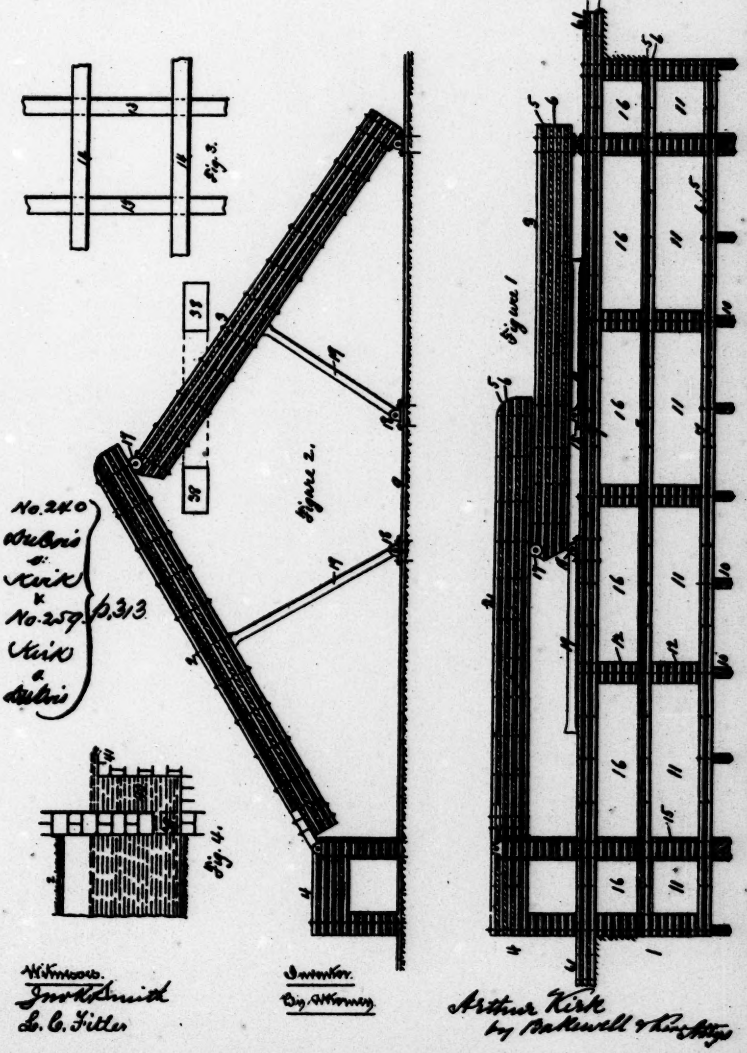
Inventor Arthur Kirk
per Attorneys Bakewell & Kerr

(No Model.) 3 Sheets—Sheet 1.

A. KIRK.

MOVABLE DAM.

No. 268,411. Patented Dec. 5, 1882.



Witnesses.
Jno. H. Smith
L. C. Fitler

Inventor.
By Attorney

Arthur Kirk
by Bakewell & Kingsley

The gates 2 and 3 are constructed, as described, of longitudinal and transverse courses of boards or planks 5 and 6, which break joint with each other. These gates are of any desirable length, being made long enough to extend across the stream. This is possible by reason of the boards or planks of which they are formed overlapping each other, so that, in fact, there need be no limit to the length of the dam. The gates are hinged so that the upper one 2, overlaps the end of the lower one, 3, whether opened or closed. In order to relieve the friction of the lower gate on the upper one in opening and closing, I provide the lower one, 3, with a friction roller or rollers, 17, at its outer upper edge. The gate 3 is hinged to the foundation 1, and when closed lies flat near the floor 9. The gate 2 is hinged to a wall, 4, at such a height that when closed, it shall be horizontal, or nearly so, and rest upon the gate 3. Under the gates, and hinged to the foundation at 18, are pivoted supports 19, used for sustaining the gates in an open position to facilitate repairs, as shown in Fig. 2. When not in use the supports 19 are laid flat on the floor 9, as shown in Fig. 1.

The hinge, Figs. 7 and 8, is of novel construction. The eye 20 is bolted to the foundation. The pintle 21 is bolted to the gate. It consists of a plate, 22, by which it is bolted to the gate or gates, a central web, 23, and a pintle, 21, extending both ways from the central web, forming two pintles, 24. Each pintle 24 enters the recess 25 of one end of the eye or socket piece 20. The socket piece 20 is like a section of a tube having a central division wall, so as to strengthen and divide it into two parts. The pintles 24 enter the adjacent
318 ends 25 of each of two socket pieces 20, and the socket pieces are secured firmly in place by bolts 26 and the pintle pieces by bolts 27. The upper side is cut away, as at 28, to provide room for the web 23, while below the edges meet. On the under side are projections 29, which are let into the foundation. This hinge is strong, cheap, and durable, and the parts fit together so as to be water-tight. By simply adding other pieces it can be extended to any desirable length. I prefer to make the meeting edges serrated or of equivalent form, so that the water which enters between them is caused to act as a packing to the joint and seal it.

The gate or gates 2 and 3 are provided with telescoping section or joint 30, (see Fig. 5,) which is formed by cutting the longitudinal courses of timber off with an even edge, as at 31, across the gate, and the transverse courses in like manner, as at 32, back of the ends 31 of the longitudinal timbers. The part between the two cuts 31 and 32 is not bolted, so that the interleaved ends are free to move on each other, and in case of the settling of the foundation 1 at any point the gate, parting slightly, as at 30, is able to accommodate itself thereto. Heretofore the rigid structure of the gates caused them to stand straight, and not follow the foundation in case of its sinking. The joint 30 is water-tight, and is simple in form and construction, easy and effective in operation.

At the ends of the dam I form a water-tight joint between the gate or gates and the stationary abutment 33 by means of a movable timber or piece, 34, running transversely of the gate in a recess on

its edge. Back of the timber 34 is a recess or channel, 35, which communicates to the water above by a large inlet opening, 36, at the upper end, and has a smaller discharge opening, 37, at the lower end. The water from above, entering the channel 35 by the large opening 36, causes the piece 34 to be pressed out against the wall 33 and form a tight joint therewith. The water escapes from
319 the channel 35 by the small exit 37. There is little friction between the piece 34 and the wall 33, because as soon as the gate 2 begins to descend the pressure on 34 is relieved and it falls back in the recess 35. The discharge 37 is to prevent the collection of sediment in the recess 35, which might prevent the working of the piece 34.

In the end wall of the dam I make an open sluice, water-way, or tail race, 38, Fig. 2, at such height as will permit all water which is not required to sustain the gates to escape from under them. When the gates are down, as in the position shown in Fig. 1, the water is admitted by the wickets under them. This raises and floats them up until they reach the position shown by Fig. 2. By that time the water having reached the sluice 38, which passes through the wall around the end of the gate, will flow freely through, sustaining the gates at that level.

A modified construction of the sluice 38 is shown by Fig. 4, where the outlet 39 in the wall is below the level of the water, the latter passing through the outlet 39 into a fore bay or well 40, and thence over the bridge 41.

If desired, the discharge opening may be controlled by a valve operated by a float.

It is apparent that the form, place, and details of construction of the sluice for relieving the gates from excessive pressure below can be varied by the skilled constructor; but in all cases an open channel will be necessary when the water has reached a certain height or pressure under the gates.

I bring the operation and control of the wickets for admitting and discharging the water to and from the dam to one spot and put it under the control of one man. To the shaft of each wicket 42, Fig. 9, I attach a lever, 43, the other end of which is connected to a piston, 44, working in a cylinder, 45, from which a pipe, 46 leads to the operator's stand 47. The pipe 46 is connected to a compressed-air tank, 48, and is controlled by a suitable cock, 49. All of the wickets are similarly connected. The operator, having the cocks all within reach, can open and close the wickets at
320 pleasure and with uniformity. I thus save in labor and time and secure great efficiency of operation. I prefer to use a three-way cock and a vacuum-cylinder, 50, for relieving the pressure on the pistons, 44, as thereby the action is more prompt. I can use steam, water or other liquid or gaseous medium for actuating the pistons by simply adapting the apparatus thereto.

I have also devised an automatic signal which shall show the exact height and position of the dam. On the end wall I erect a frame of posts, 51 and 52, and cross-piece 53. A stationary lantern, 54, flag, or other signal is placed on the cross-piece 53 at a suitable

point. A rope or chain, 56, is fastened to the outer end of the rising gate 2, and passes up over pulleys, 57, placed at the corners of the framing, and is provided with a weight, 58, at the other end. A lantern, 59, or other signal is fastened to the chain 56 in such relation to the signal 54 that upon the rising or falling of the gate 2 it shall change its relative position to the signal 54, and thereby clearly indicate the exact position of the gate or dam. The operation of the signal by the moving of the gate itself insures absolute accuracy and great consequent safety.

The planking of the various parts of the foundations and gates which are exposed to water is fastened by wooden screw-bolts 60. Fig. 6, the threads of the male screw being preferably of a quicker pitch than that of the female screw, so as to force the parts tightly together. The bolts are made of dry or partially dried wood, and when exposed to the water will swell and make a very tight fastening.

I am aware that the crib-work has heretofore been constructed of timber upon a float or floor composed of several courses of dressed planking or timber, and also that guards and a horizontal apron have been arranged on the down-stream side of the dam to arrest the silt and detritus and prevent the undermining of the dam by the backwash of the water, and do not herein claim the same; but

321 What I claim as my invention, and desire to secure by letters patent, is—

1. A dam foundation constructed of several floors having intervening spaces divided into compartments by partitions formed of boards laid to cross each other at intervals and cemented between, and the compartments filled with stone or other suitable substance, substantially as and for the purposes described.

2. A dam foundation composed of two or more floors, the space between the floors being filled with stone or like material, and the upper floor extending beyond the substructure to prevent the wash and percolation of the water from undercutting the foundation, substantially as specified.

3. A dam-gate hinge consisting of a double journal or pintle bolted to one part, working in the adjacent ends of a double-ended sleeve secured to the other part on each side of it, said sleeve having a central partition to strengthen it and separate the two ends of the adjacent pintles, substantially as and for the purposes described.

4. A rising dam gate or gates provided with a telescoping joint, substantially as and for the purposes described.

5. The combination, with a dam gate and its abutment, of a movable timber-piece running transversely of the gate, and means, substantially as specified, for exerting a yielding pressure on the movable timber-piece, whereby a tight joint between the abutment and gate is obtained, substantially as and for the purposes specified.

6. A bear-trap dam having a relieving or open sluice extending from under the gates, so as to relieve them from unnecessary pressure, substantially as and for the purposes described.

7. A rising dam provided with hinged supports under the gates, substantially as and for the purposes described.

8. The combination of the wicket stems with pistons con-
322 nected thereto, cylinders, pipes leading to a common central office, and controlling valves, whereby all the wickets may be operated by liquid or fluid pressure from a common center, substantially as and for the purposes described.

9. The combination of a rising dam with a signal chain or cord attached thereto, and a lantern or other signal to indicate the condition of the dam by its change of position, substantiallly as and for the purposes described.

10. A wooden dam or foundation, the courses of which are fastened by wooden screw-bolts substantially as and for the purposes described.

In testimony whereof, I have hereunto set my hand.

ARTHUR KIRK.

Witnesses:
JOHN S. KENNEDY.
JOSEPH MOLL.

COMPLAINANT'S EXHIBIT KIRK CAVEAT.

Caveat.

To the Commisioner of Patents of the United States of America:

I, Arthur Kirk, of Pittsburgh, Pennsylvania, file this, my caveat, for an invention I am now experimenting upon and improving, to be used in connection with, and as a feature of movable dams, used on rivers, canals, creeks or any body of water, having paid into the Treasury of the United States the sum of ten dollars, and complied with all the other provisions of the act of Congress in such case made and provided.

Specification.

To all whom it may concern:

Be it known that I, Arthur Kirk, of Pittsburgh, Pennsylvania, have invented a plan to be used in connection with, and as a part of the movable dam known as the "bear-trap movable dam," and
223 all other movable dams which are or may be used for the purpose of damming or holding water, in rivers, canals, streams or any other bodies of water.

My invention consists in—

First. Of an open sluice, or water-way or tail race, placed at such a height in the end wall of the dam as will permit all water to escape out from under the dam that is not needed to support it when up, leaving only enough water to support it, and all water above that to be permitted to freely escape out from under the dam into the pool below, thereby freeing the dam from all unnecessary pressure that might break it. I also claim the right to use all arrangements

of valves, floats or other arrangements that may have for its object the freeing of the gate from extra or unnecessary pressure.

Second. My second improvement consists in an arrangement and application of wheels, bars, levers, etc., whereby the lock tender is enabled to operate and control the action of all valves or parts from one central or controlling point, either by mechanical or hydraulic action, or pneumatic power, and this part I ask shall be antedated two years, namely January 5, 1878.

Third. My third improvement consists in an arrangement and application of bars, levers, wheels, ropes, chains or pipes so connected to the rising and lowering part of the dam or hydraulic gate, and any suitable indicator by means of flags, lanterns, or any other object to indicate and show to the lock tender or others, either near or distant, the exact position or elevation of the dam or gate, although the same may be covered by water and of itself invisible, by water, darkness or otherwise.

Witnesses:

—— ——.

—— ——.

324 COUNTY OF ALLEGHENY, } ss:
State of Pennsylvania, }

On this — day of January, 1880, before me, the subscriber, a —, personally appeared the within named Arthur Kirk, and made solemn oath that he verily believes himself to be the original and first inventor of the method herein described for "improving and rendering more valuable movable dams" used in rivers, canals, creeks and other bodies of water. And that he does not know or believe the same was ever before known or used, and that he is a citizen of the United States of America.

Sworn and subscribed before me this — day of January, 1880.

DU BOIS' APPLICATION.

Filed April 19, 1881, No. 31228.

Petition.

To the Commissioner of Patents:

Your petitioner, a citizen of the United States, residing at Du Bois, county of Clearfield, State of Pennsylvania, prays that letters patent may be granted to him for the improvements in dams and locks set forth in the annexed specification; and he hereby appoints P. T. Dodge, of Washington, D. C., his attorney, with full power of substitution and revocation, to prosecute this application, to make alterations and amendments therein, to receive the patent, and to transact all business in the Patent Office connected therewith.

JOHN DU BOIS.

325 *Oath.*

STATE OF PENNSYLVANIA, } ss :
County of Lycoming, }

John Du Bois, the above-named petitioner, being duly sworn, deposes and says that he verily believes himself to be the original and first inventor of the improvements in dams and locks described and claimed in the accompanying specification; that he does not know or believe that the same was ever before known or used; that he is a citizen of the United States, and that said invention has not been patented in any foreign country, or been in public use or on sale in the United States for more than two years with his knowledge or consent.

JOHN DU BOIS.

Sworn to and subscribed before me, this 6th day of April, 1881.

H. T. AMES,
Notary Public.

[SEAL.]

No. 240
Dubois
v.
Kirk
No. 259
Kirk
v.
Dubois
} p. 326

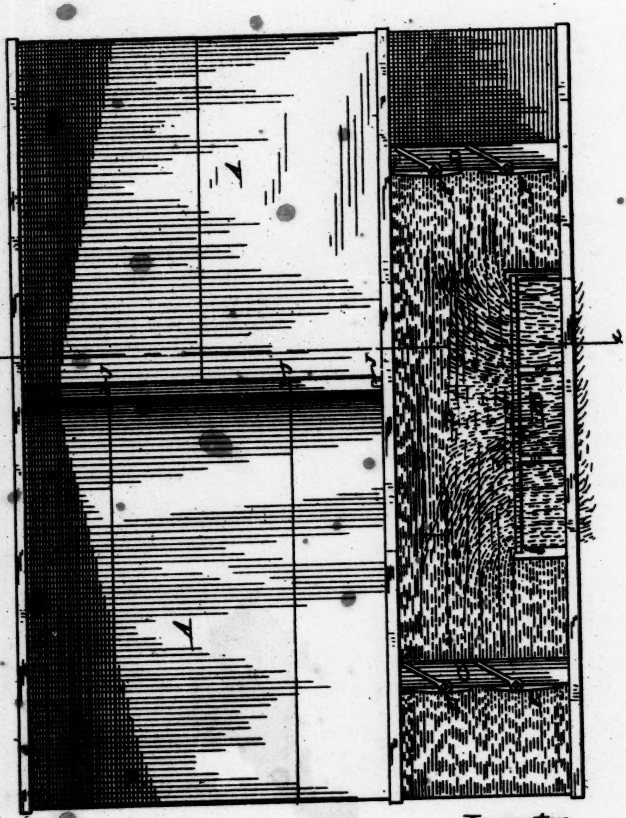


Fig. 2.

Witnesses.

Sidney P. Hollingsworth.

Walter J. Dodge.

Inventor

John Du Bois.

By. P. T. Dodge.

Atty.

No. 240
Dubois
Kiln
No. 259
Kiln
Dubois

p. 327

Fig. 1.

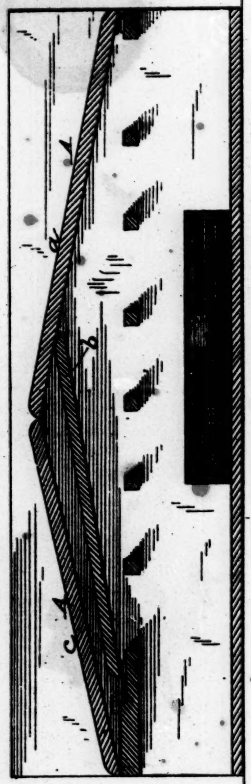
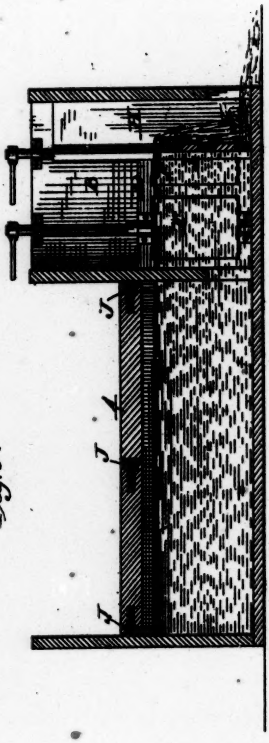


Fig. 2.



Witnesses.

Sidney P. Wellington

Walter I. Dodge.

Inventor.

John Du Bois.

By P. T. Dodge

Atty.

*

Specification Describing Certain Improvements in Dams and Locks Invented by John Du Bois, of Du Bois, in the county of Clearfield, and State of Pennsylvania.

My present invention relates to improvements designed more particularly for use in connection with that system of dams and locks represented in letters patent heretofore granted to me, Nos. 229,682 and 236,488.

The objects of the present invention are, first, to prevent the flexible gates or dam sections from being subjected to an excessive or dangerous pressure of water from beneath; and, to prevent the leakage of water past and between the various sections of which the lock or dam may be composed, thus preventing leakage and permitting the gates or dams when of great length, to be made in numerous sections arranged side by side in order that they may adapt themselves the more readily to slight changes or settling of
328 the foundation, or the hinges, without interfering with their proper action.

The first part of my invention for limiting water pressure beneath the gates or dam, consists in the use of an overflow or discharge opening arranged *in* (amendment, May 17, 1881,) the flume or supply chamber at such height as to permit the escape of the water by or past the gate whenever the desired limit of pressure is reached. This device may be of any suitable construction and arrangement provided only, that it limits automatically the elevation or head of the water passing to or beneath the gate or dam. [The second feature of the invention consists in an elastic packing introduced between the edges of the gate or dam section, or between the edges of the sections and the abutments against which they work, the device being preferably a packing strip mounted in the edge of one section and urged outward against the edge of the adjacent section by means of springs or equivalent devices.] *The second part of my invention consists in a flexible dam consisting of hinged overlapping leaves, each leaf composed of a series of sections arranged side by side, said leaves being provided, when required, with packing in the adjacent sections.* (Substituted May 31, 1881.)

Referring to the accompanying drawings, Fig. 1 represents a vertical cross-section of my dam.

(Here follows diagrams marked pp. 326 & 327.)

Fig. 2, a top plan view of the same.

Fig. 3, a longitudinal section of the same on the line *x-x* in Fig. 2.

A, represents my dam or gate, consisting of leaves or sections *a*, *b*, *c*, connected and arranged as in my previous patent, so that they may be raised and lowered at their inner ends, the elevation being effected by the admission of water into the space or chamber beneath the gate in order to force the same upward.

Under the construction represented in my previous patents,
329 a possibility existed of the gates being subjected to an ex-

cessive and dangerous pressure in the event of the water above the dam attaining an excessively high head or elevation.

In order to avoid this danger I now provide the flume B, through which the water is introduced to and discharged from the space beneath the dam, with transverse bulkheads, C, D, containing gates or wickets, E, F, for controlling the passage of the water to and from the gate. Water being admitted beneath the gate, elevates the same and at the same time rises within the flume or supply chamber, above the lower bulkhead, D, the gates, F, being closed to maintain the head of water beneath the gate.

In the flume, B, in *advance of or* (amendment, May 17, 1881,) above the bulkhead, D, I form a lateral discharge or overflow chamber, H, through the top of which the water may escape from the flume or supply chamber whenever the fixed limit of elevation is reached.

The inner side of the discharge or overflow chamber H, over which the water flows to escape, is composed of a series of planks, I, seated one upon another in grooves in the frame.

By adding additional boards to, or removing boards from the series, the height of the overflow wall may be increased or diminished to any extent desired, and in this way the elevation of the water and the consequent elevation of the dam may be fixed at any point desired, it being manifest that as soon as the water reaches an elevation at which it can escape through the chamber H, the elevation of the dam will cease. Thus, it will be seen, undue strain upon the dam is prevented and the elevation of the same automatically checked, at the point desired.

While it is preferred to construct the outlet chamber in the manner shown, it is obvious that it may be modified in form and arrangement to any extent desired, the only requirements being that there shall be an overflow or outlet through which the water may escape to relieve the dam from pressure whenever the latter has reached the proper limit of elevation.

Passing now to the packing by which leakage around or between the dam sections is prevented, it will be seen to consist simply of a strip or bar J, inserted in a groove in the edge of one section and urged outward by a spiral spring against the edge of the adjacent section. The packing strip may consist of a wooden bar, or of a wooden bar faced with rubber, or other suitable material. In place of the spiral spring, flat springs may be used or water may be admitted through openings from the interior of the dam to the space behind the packing strips for the purpose of forcing them outward. It will be noticed in the drawings that each leaf of the dam, instead of being made in one continuous length as in my previous patents, it is composed of a number of sections arranged side by side. By thus constructing the dam and providing the packing between the edges of the sections, I am enabled to secure a better and more satisfactory action in the event of the foundation springing or becoming untrue. The sections of each leaf should overlap the joints or break joints with the sections of the outer leaf or leaves, *as represented in Fig. 2 of the drawing. It will be readily seen that by arranging the sections of each*

leaf to overlap the joints, or in other words, to break joints with the leaves of the contiguous sections, the dam, when of great length, is given a limited amount of flexibility, while at the same time the sections of the leaves are caused to remain substantially in line with each other, and the individual sections prevented from rising or falling out of their proper positions. (Inserted May 17, 1881.)

Having thus described my invention, what I claim is:

1. In combination with a flexible dam or gate, *having* (amendment, May 17, 1881,) means for conducting and maintaining water thereunder, an elevated overflow or discharge to limit the water pressure beneath the dam.

331 2. The combination of a jointed or flexible gate elevated by the admission of water thereunder, and a vertically adjustable outlet to limit the head of the water passing beneath the dam.

3. In combination with the flexible dam, the flume B, and wickets F, the discharge or overflow chamber H, arranged in connection with the flume, substantially as shown.

4. In combination with dam A, the flume B, and means for retaining a head of water in the flume and beneath the dam, the overflow chamber H, provided with removable boards, I.

[5. In combination with the flexible dam, the packing strip seated within the edge of the same, substantially as shown.

6. The flexible dam or gate, having each of its leaves or sides composed of two or more sections arranged side by side, with a packing between, substantially as shown.

7. In combination with the dam sections arranged edge to edge, the packing strip inserted in a groove in one edge and urged outward by springs, substantially as described and shown.]

5. A flexible dam or gate consisting of hinged overlapping leaves, each leaf composed of a series of sections arranged side by side, and provided with packing seated in grooves in their adjacent edges, substantially as shown. (Substituted May 17, 1881.)

8. (6.) A flexible dam or gate consisting of co-operating leaves or sides, each leaf composed of a series of sections, the sections of one leaf arranged to overlap or break joint with the sections of the other leaf, substantially as described.

JOHN DU BOIS.

Witnesses:
H. T. AMES.
J. V. VAN FLEET.

* In this specification, matter inserted by amendment is italicized, and matter cancelled is contained in brackets.

332 WASHINGTON, D. C., *May* 12, 1881.

John Du Bois, care P. T. Dodge, present:

"Dams and locks." Filed April 19, 1881. Serial No., 31228.

Application examined: On page 1, line 17, after "arranged," "in" should be substituted. After "dam," line 45, it is thought, there

should be inserted something like the following, i. e., "which flume B is provided."

Does "above," line 51, same page, mean *upstream* from or *vertically over?* If the former, it is thought that it should be more fully set forth.

Line 14, page 2, should not "water" be erased, and "latter" be substituted? That the paragraph preceding the claim may be readily understood, descriptions relative to the "break-joint" feature should be inserted, and letters of reference be employed in the same. As to the claims, in the first, it is thought that "having" should be inserted after "gate," line 1.

As to the third claim it would appear essential to complete function that the wickets E are essential elements.

The fifth claim is lacking in patentable novelty in view of patents No. 168,524, October 5, 1875, to T. Parker, and No. 214,324, April 15, 1879, to Tainter and Parker. (Water gates.)

The sixth claim is held to be lacking in novelty over the above references, being for a mere double use of the well-known packing of water-gate edges. The seventh claim embraces but a substitution of one old packing strip for another; see patent No. 13090, June 19, 1855, to O. C. Hill. (Weather strips.)

If the eighth claim is to stand, the description must be made more clear on the point of the "break-joint" feature.

Claims 5, 6 and 7 are rejected.

333 John Du Bois. Dams and Locks. April 19, 1881. No. 31228. } Application for Patent.

Honorable Commissioner of Patents.

SIR: I present herewith an amendment drawn in view of the references and suggestions contained in the official letter.

Regarding the suggestion that the wickets E, are necessary in order to render the combination named in the third claim an operative one, I beg to say that such does not seem to be the fact. While it is preferred, in practice to make use of the wickets E, in order that the dam may be the more readily lowered, it is obvious that the opening of the wickets F would result in the lowering of the dam as the flume would be thereby opened and the free flow of the water past the dam permitted.

JOHN DU BOIS,
By P. T. DODGE.

John Du Bois. Dams and Locks. April 19, 1881. No. 31228. } Application for Patent.

Honorable Commissioner of Patents.

SIR: I hereby amend as follows:

Page 2, line 17, after "*arranged*" insert "*in.*"

Page 2, line 51, before "*above*" insert "*in advance of, or.*"

Page 3, line 14, cancel "*water*" and substitute "*latter.*"

Page 3, line 33, cancel "*substantially as described,*" and insert "as represented in Fig. 2 of the drawing. It will be readily seen that

by arranging the sections of each leaf to overlap the joints, or in other words, to break joints with the leaves of the contiguous sections, the dam, when of great length, is given a limited amount of flexibility, while at the same time the sections of the leaves are caused to remain substantially in line with each other, and the individual sections prevented from rising or falling out of their proper position."

Claim 1, after "*gate*" insert "*having*."

Cancel claims 5, 6 and 7 and insert:

334 5. The flexible dam or gate consisting of hinged overlapping leaves, each leaf composed of a series of sections arranged side by side and provided with packing seated in grooves in their adjacent edges, substantially as shown.

JOHN DU BOIS,
By P. T. DODGE, *Attorney.*

May 17, 1881.

WASHINGTON, D. C., *May* 26, 1881.

John Du Bois, care P. T. Dodge, present:

"Dams and locks." Filed April 19, 1881.

Serial No., 31228.

In view of the amendment filed the 17th inst., the "second feature of the invention," should be limited, since the original claim sustaining it has been erased in view of the state of the art as shown by the references heretofore cited.

B. W. POND, *Examiner.*

T. C. TIPTON,
Assistant Examiner.

John Du Bois. Dams and Locks. April 19, 1881. No. 31228. } Application for Patent.

Honorable Commissioner of Patents.

SIR: I hereby amend as follows:

Page 2, line 22, cancel from "*The*" to the end of line 28, same page, and substitute:

"The second part of my invention consists in a flexible dam consisting of hinged overlapping leaves, each leaf composed of a series of sections arranged side by side, said leaves being provided, when required, with packing in the adjacent sections."

Respectfully, etc.,

JOHN DU BOIS,
By P. T. DODGE.

335 WASHINGTON, D. C., *June* 9, 1881.

John Du Bois, care P. T. Dodge, city.

SIR: Your application for a patent for an improvement in dams and locks, filed April 19, 1881, has been examined and allowed.

Very respectfully,

E. M. MARBLE,
Commissioner of Patents.

WASHINGTON, D. C., *June* 27, 1881.

Hon. E. M. Marble, Commissioner of Patents.

SIR: I desire to withdraw from the issue, the application of John Du Bois, No. 31228, filed April 19, 1881, for "dams and locks," and passed for issue June 8, 1881. This withdrawal is requested in view of a probable interference with a recently filed application.

B. W. POND, *Examiner.*

T. C. T.

WASHINGTON, D. C., *June* 27, 1881.

John Du Bois, care P. T. Dodge, present:

"Dams and locks." Filed April 19, 1881. No. 31228.

It is found necessary to withdraw this case from the issue, in view of a probable interference with a pending application. The interfering matter being embraced in the first claim in this application. As soon as the other application is in proper condition, the interference will be declared.

B. W. POND, *Examiner.*

T. C. TIPTON,
Assistant Examiner.

336 John Du Bois. Lock and dam. Filed April 19, 1881. No. 31228.

Honorable Commissioner of Patents.

SIR: I hereby request that steps be taken looking to a speedy declaration of the threatened interference, delay in the matter being greatly to the prejudice of applicant's interest.

Respectfully,

P. T. DODGE,
Attorney for Du Bois.

WASHINGTON, D. C., *July* 22, 1881.

John Du Bois, care P. T. Dodge, Washington, D. C.:

Please find below a copy of a communication from the examiner concerning your application for a patent for "dams and locks," filed April 19, 1881, No. 31228.

Very respectfully,

E. M. MARBLE,
Commissioner of Patents.

Room No. 43.

Your case, above referred to, is adjudged to interfere with others, hereafter specified, and the question of priority will be determined in conformity with the rules.

The statement demanded by rule 105 must be sealed up and filed on or before the 23d day of August, 1881, with the subject of the invention, and name of party filing it, indorsed on the envelope. The subject-matter involved in the interference is, "in combination with a flexible dam or gate having means for conducting and maintaining water thereunder, an elevated overflow or discharge to limit the head of water passing beneath the dam."

The above subject-matter constituting applicant's first claim, and being substantially covered in the opposing applicant's ninth claim.

337 The interfering application is that of Arthur Kirk, of Sharpsburg, Allegheny county, Pennsylvania, filed May 31, 1881, No. 34648, and whose attorneys are Bakewell & Kerr, of Pittsburgh, Pa.

B. W. POND, *Examiner.*

T. C. TIPTON,
Assistant Examiner.

Inventor, John Du Bois.
Examiner, B. W. Pond.
} Improvements in Dam & Locks.

Class No. 61, patent No. —, serial No. 31228, filed April 19, 1881. The height of the water beneath the dam sections is regulated by a vertically adjustable overflow, or outlet gate; each leaf of the dam is formed of sections arranged in "break-joint" order, and having packing strips between their edges.

Serial No., 31228.

Examiner book No. 97—356.

1881.

Patent No. —.

John Du Bois, of Du Bois, county of Clearfield, State of Pennsylvania. Invention "dams and locks."

Parts of application filed.
- Petition April 19, 1881.
- Affidavit April 19, 1881.
- Specification April 19, 1881.
- Drawnings, two sheets, April 19, 1881.
- Model not required.
- Specimen.
- First fee, cash $15, April 19, 1881.
- First fee certified.

Application filed complete April 19, 1881.

Examined June 8, 1881, B. W. Pond.

Countersigned June 9: J. W. Babson, for Commissioner.

Notice of allowance, June 9, 1881.

338 Final fee, cash.

Final fee certified.

Patented.

Attorney, or P. O. address, P. T. Dodge, present.

1881.

Contents.

Application papers.

1. May 13, 1881. Rejection.
2. Amendment A, B, May 17, 1881.
3. May 26, 1881. Letter.

4. Amendment C, May 31, 1881.
5. June 27, 1881, letter withdrawing case from issue.
6. Letters to office, July 19, 1881.
7. July 22, 1881, × 107—502.
8. Decided in favor of 107—502, February 11, 1882.

Title.

Improvement in dams and locks.

WASHINGTON, D. C., *July 22d*, 1881.

To the examiner of interferences:

An interference is found to exist between the applications, and in respect to the invention specified below, to wit:

1st. Application No. 34648, Arthur Kirk, Sharpsburg, Pa. "Movable dams," filed May 31st, 1881. Bakewell and Kerr, of Pittsburgh, Pa., attorneys.

2d. Application No. 31228, April 19th, 1881. For "dams and locks," John Du Bois, of Du Bois, Clearfield Co., Pa. P. T. Dodge, of Washington, D. C., attorney.

Invention.

"In combination with a flexible dam or gate, having
339 means for conducting and maintaining water thereunder, an elevated overflow or discharge to limit the head of water passing beneath the dam."

The above constitutes the first claim in the Du Bois application, and is substantially the 9th claim of Kirk.

B. W. POND, *Examiner.*

T. C. TIPTON,
Assistant Examiner.

KIRK
vs.
DU BOIS. } Lock and Dam.

And now comes John Du Bois by his attorney, P. T. Dodge, and moves that the time for filing preliminary statements in this case, be extended thirty days on account of his inability to prepare his statements within the time now fixed, as appears by the accompanying affidavit.

JOHN DU BOIS,
By T. P. DODGE, *Attorney.*

To Bakewell & Kerr, attorneys for Kirk.

The extension of time asked for in the above motion is hereby agreed to.

August 17th, 1881.

BAKEWELL & KERR.

STATE OF PENNSYLVANIA, } ss:
Clearfield County, }

On this thirteenth day of August, A. D. 1881, personally came before me, a justice of the peace in and for the county aforesaid, John Du Bois, of Du Bois, Pa., who, being duly sworn according to law, doth depose and say: That in the matter of the interference between his own application for a patent for improvement in dams and locks now pending in the U. S. Patent Office, and that of Arthur Kirk, of Sharpsburg, Pa., for the same or similar patent, he, the said Du Bois, will require more time for the purpose of making his preliminary statement.

JOHN DU BOIS.

340 CLEARFIELD COUNTY, *ss:*

Sworn to and subscribed before me this thirteenth day of August, A. D. 1881.

J. P. TAYLOR,
Justice of the Peace.

[SEAL.]

WASHINGTON, D. C., *August* 19, 1881.

KIRK
vs.
DU BOIS. } Before the Examiner of Interferences.

Subject-matter: Movable dams.

Arthur Kirk, care of Bakewell & Kerr, Pittsburgh, Pa.; John Du Bois, care of P. T. Dodge, Washington, D. C.:

Per stipulation, the time for filing statements is extended to September 22, 1881.

FRANK MACARTHUR,
Acting Examiner of Interferences.

WASHINGTON, D. C., *September* 24, 1881.

KIRK
vs.
DU BOIS. } Before the Examiner of Interferences.

Subject-matter: Movable dams.

Arthur Kirk, care of Bakewell & Kerr, Pittsburgh, Pa.:

Kirk will be required to amend his statement so that it will set forth the date when he first illustrated his invention by drawing or model, and when he completed it. Until October 5, 1881, will be allowed for the purpose of filing the amendment called for.

FRANK MACARTHUR,
Acting Examiner.

EDWARD KENT, JR.,
Assistant Examiner.

341 WASHINGTON, D. C., *September* 24, 1881.

KIRK *vs.* DU BOIS. } Before the Examiner of Interferences.

Subject-matter: Movable dams.

John Du Bois, P. T. Dodge, present:

Du Bois will be required to amend his statement so that it will identify the invention in issue, and set forth when such invention was conceived, illustrated by drawing or model, disclosed to others, when completed, and to what extent the same has been used.

Until October 5, 1881, will be allowed for the purpose of filing the amendment called for.

FRANK MACARTHUR,
Acting Examiner.

EDWARD KENT, JR.,
Assistant Examiner.

PITTSBURGH, *October* 1, 1881.

To the Commissioner of Patents.

SIR: In Kirk *vs.* Du Bois, Kirk's preliminary statement was held to be informal, but the statement was not returned for amendment. Please return the statement and extend our time for amendment for a week.

Very respectfully, BAKEWELL & KERR.

KIRK *vs.* DU BOIS. } Locks and Dams.

Honorable Commissioner of Patents.

SIR: I hereby request that the time for filing the amended preliminary statement in behalf of Du Bois be extended ten days for the reason set forth in the accompanying affidavit.

P. T. DODGE,
Attorney for Du Bois.

342 DISTRICT OF COLUMBIA, *County of Washington,* } *ss:*

P. T. Dodge, being duly sworn, deposes and says that he is attorney for John Du Bois in the above-entitled interference, that he was informed and believes that additional time will be necessary to ascertain definitely the facts required for the amended preliminary statement demanded by the office. Further deponent saith not.

P. T. DODGE.

Sworn to and subscribed before me this 3d day of October, 1881.

W. C. DUVALL,
Notary Public, D. C.

[SEAL.]

KIRK
vs.
DU BOIS. } Locks and Dams.

Honorable Commissioner of Patents.

SIR: I present herewith additional statement of John Du Bois just received. Manifestly, through inadvertence the word "open" has been omitted from the statement. A new statement in conformity with the facts given attorney by the applicant, Du Bois, has been forwarded for execution and the same will be filed during the present week.

P. T. DODGE,
Attorney for Du Bois.

WASHINGTON, D. C., *October* 4, 1881.

KIRK
vs.
DU BOIS. } Before the Examiner of Interferences.

Subject matter: Movable dams.

A. Kirk, care of Bakewell & Kerr, Pittsburgh, Pa.; John Du Bois, care of P. T. Dodge, Washington, D. C.:

The time for filing statements in this case is extended to and including October 15, 1881.

343 Kirk's preliminary statement being a part of the record in this case cannot be returned as requested.

J. E. M. BOWEN,
Acting Examiner of Interferences.

In the matter of interference with my application for improvements in dams and locks, dated April 19, 1881, No. 31228, by an application by Arthur Kirk, of Sharpsburg, Pa., filed May 31, 1881, No. 34648, I hereinafter make my preliminary statement, to wit:

I have built chambers open at the top to allow the water to flow over when full, for more than two years past. I provided against the unnecessary pressure of the water under the gate or dam, by the use of a float in the chamber attached to machinery to open the lower wicket in a chamber and close the upper one.

Some time in the winter of 1880 and 1881, among other improvements in my movable dam, I saw the necessity of further providing against the carelessness of persons handling gates in a lock. I made an application, among other improvements, to make the chamber adjustable so that it could be set and left at any desired height, and the same was filed as above stated April 19, 1881, No. 31228.

JOHN DU BOIS.

Subscribed and sworn to before me at Du Bois, Pa., this 17th day of September, A. D. 1881.

J. P. TAYLOR,
Justice of the Peace.

[SEAL.]

KIRK
vs. } Movable Dams.
DU BOIS.

John Du Bois, being duly sworn, deposes and says: That he conceived the idea of delivering water beneath dams, similar to
344 those shown in his pending application, through a channel [open] at the top permitting the water to escape and relieve the dam when the head rose above the proper limit. over two years ago, but he is unable to give the exact date; that he conceived the peculiar construction represented in his drawing for controlling and adjusting the level or head of the water previous to its passage beneath the dam during the winter of 1880 and 1881, as he believes, on or before the 1st day of December, 1880; that he described the same to others as early as the 15th day of January, 1881; that as yet he has made no model and has built no dam similar to that shown in his pending case.

JOHN DU BOIS.

Witnesses:
GEORGE RICHARD VOSBURG.
JOSEPH PERRY TAYLOR.

Sworn to and subscribed before me, a justice of the peace for Clearfield county, Pennsylvania, on this 10th day of October, A. D. 1881.

J. P. TAYLOR,
Justice of the Peace.

[SEAL.]

KIRK
vs. } Locks and Dams.
DU BOIS.

John Du Bois, being duly sworn, deposes and says, that he conceived the idea of delivering water beneath dams similar to those shown in his pending application through a channel open at the top, permitting the water to escape and relieve the dam when the head rose above the proper limit, over two years ago, but he is unable to give the exact date; that he conceived the peculiar construction represented in his drawing for controlling and adjusting the level or head of the water previous to its passage beneath the dam during the winter of 1880 and 1881, as he believes, on or before the 1st day of December, 1880; that he described the same to others
345 as early as the 15th day of January, 1881; that as yet he has made no model, and has built no dam similar to that shown in his pending case.

JOHN DU BOIS.

Witnesses:
GEORGE RICHARD VOSBURG.
THOMAS GEORGE GORMLEY.

Sworn to and subscribed before me, a justice of the peace, this 17th day of October, A. D. 1881.

J. P. TAYLOR,
Justice of the Peace.

[SEAL.]

STATE OF PENNSYLVANIA, } ss:
County of Clearfield, }

I, James Kerr, prothonotary of the court of common pleas of the county and State aforesaid, do hereby certify that J. P. Taylor, Esq., before whom the foregoing oath or affidavit was taken, was an acting justice of the peace at the date indicated, and his act is entitled to full faith and credit.

JAMES KERR,
Prothonotary.

[SEAL.]

WASHINGTON, D. C., *October* 26, 1881.

KIRK
vs.
DU BOIS. } Before the Examiner of Interferences.

Subject-matter: Movable dams.

Arthur Kirk, care of Bakewell & Kerr, Pittsburg, Pa.; John Du Bois, care of P. T. Dodge, Washington, D. C.:

The parties hereinafter named are hereby notified that as to their inventions, adjudged to interfere with each other in the particulars specified in office letter of the 22d of July, 1881, a hearing will be granted on the 20th day of January, 1882.

346 The testimony of the respective parties must be closed previous to the dates hereinafter designated. The party first filing an application for a patent will be deemed the first inventor, in the absence of proof to the contrary.

Rebutting testimony, but no other, may be taken by parties on whom rests the burden of proof after the closing of the testimony of the party who first filed his application.

All testimony must be taken, forwarded and printed, in accordance with the published rules of practice of the office.

Arthur Kirk, of Sharpsburg, Pa., filed application May 31, 1881.

Testimony-in-chief must be closed November 25, 1881. Attorneys of record, Bakewell & Kerr, of Pittsburgh, Pa.

John Du Bois, of Du Bois, Pa., filed application April 19, 1881.

Testimony must be closed December 15, 1881. Attorney of record, P. T. Dodge, of Washington, D. C.

Rebutting testimony by Kirk must be closed December 30, 1881.

J. B. CHURCH.

ARTHUR KIRK
vs.
JOHN DU BOIS. } Interference. Movable Dams.

And now, to wit, November 22, 1881, it is stipulated that the times for taking testimony and hearing in this case be all extended twenty days.

BAKEWELL & KERR,
Attorneys for Arthur Kirk.
P. T. DODGE,
Attorney for Du Bois.

347 WASHINGTON, D. C., *November* 29, 1881.

KIRK
vs.
DU BOIS. } Before the Examiner of Interferences.

Movable dams.

A. Kirk, care of Bakewell & Kerr, Pittsburgh, Pa.; John Du Bois, care of P. T. Dodge, Washington, D. C.:

Please find below a communication from the examiner in charge of interferences in regard to the above-cited case.

Very respectfully,

E. M. MARBLE,
Commissioner of Patents.

Per stipulation, the times for taking testimony in this case are extended as follows:

Kirk's testimony-in-chief to close December 15, 1881.
Du Bois testimony-in-chief to close January 5, 1882.
Kirk's testimony in rebuttal to close January 20, 1882.
Hearing February 9, 1882.

J. B. CHURCH,
Examiner of Interferences.

KIRK
vs.
DU BOIS. } Before the Examiner of Interferences.

Application of Kirk filed May 31, 1881.
Application of Du Bois filed April 19, 1881.
The invention involved in this controversy is:

"In combination with a flexible dam or gate having means for conducting and maintaining water thereunder, an elevated overflow or discharge to limit the head of water passing beneath the dam."

Du Bois having filed no testimony must be restricted to his record date.

348 It is clearly proved in behalf of Kirk that he conceived and disclosed to others the invention in dispute as early as January, 1880, and was diligent in filing his application.

Arthur Kirk must therefore be adjudged the prior inventor.

J. B. CHURCH,
Examiner of Interferences.

FRANK BROWN,
Assistant Examiner.

February 11, 1882.

WASHINGTON, D. C., *February* 11, 1882.

KIRK
vs.
DU BOIS. } Before the Examiner of Interferences.

Subject-matter: Movable dams.

Arthur Kirk, care of Bakewell & Kerr, Pittsburgh, Pa.; John Du Bois, care of P. T. Dodge, Washington, D. C.:

Please find below a communication from the examiner in charge of interferences in regard to the above-cited case.

An appeal may be taken from the decision of the examiner within twenty days. (See section 42, of the act of July, 1870.)

Very respectfully,
E. M. MARBLE,
Commissioner of Patents.

In the matter of the interference above referred to, upon which a hearing was appointed for the 9th day of February, 1882, the question of priority of invention has been decided in favor of Kirk.

J. B. CHURCH,
Examiner of Interferences.

349 KIRK
vs.
DU BOIS. } Interference. Locks and Dams.

Honorable Commissioner of Patents:

The right of appeal on the part of Du Bois is hereby waived. In making this waiver I desire to place upon record the fact that I do not concede the patentability or practicability of the Kirk device, or any similarity of action between his device and that represented in my application.

Moreover, while admitting that Kirk did, as he states, explain to me the plan represented in his application, I desire to place upon record a denial of his having shown me the plan described in my application, or anything analogous thereto.

Respectfully,
JOHN DU BOIS,
By P. T. DODGE, *Attorney.*

United States Patent Office.

ARTHUR KIRK
vs.
JOHN DU BOIS. } Interference. Movable Dams.

COUNTY OF ALLEGHENY,
State of Pennsylvania, } *ss:*

Before me, the undersigned authority, personally appeared Arthur Kirk, who, being duly sworn, deposes and says:

In December, 1879, I visited the movable dam in Bennett's branch of the Susquehanna, near Bennezette, in Elk county. While there,

understanding the danger of injury to movable dams by the influx of too great a volume of water, I conceived my invention, that is, providing an outlet or escape for all water not needed to hold up the dam, and thus prevent any danger to the dam from excess of unnecessary pressure.

350 Sometime about the first week in January, 1880, about two weeks after my said visit to Bennezette, I communicated my idea to Mr. John Du Bois, in my office in Pittsburg. He, however, disapproved of the idea, and said that it would not accomplish the object.

In January, 1880, I engaged Mr. N. G. Ayres, of Pittsburg, to prepare the specification for filing a caveat for my invention in the Patent Office. The specification was prepared, but was not filed.

On the 17th of February, 1880, I explained my invention before a meeting of the Western Engineers' Society of Pittsburg.

During the year 1880, and the first part of 1881, I explained my invention to my son and to others, and I had repeated interviews with Mr. John Du Bois, and urged him to test my invention. In March, or the first part of April, 1881, I wrote to Mr. John Du Bois, sending him a drawing explaining the idea I had, by which my invention could most easily be applied, and urging him to try it on a dam that he was building. This letter he never answered, but at once took steps to apply for a patent for the invention.

On or about the 12th of April, 1881, I visited the residence of Mr. John Du Bois, in Clearfield county, Pennsylvania, and while there I learned that Mr. John Du Bois, after receiving my said letter of March or April, had filed his application for a patent for relieving the pressure on the gates of the dam according to my invention. I thereupon made an affidavit that I was the original inventor of the invention, which affidavit I mailed to the Commissioner of Patents.

On my return to Pittsburg, I immediately took the necessary steps to file an application for a patent for my invention, which application was filed in the office May 31st, 1881.

My invention has not as yet been put in use on dams.

ARTHUR KIRK.

351 Sworn to and subscribed before me this 21st day of September, 1881.

JOHN S. KENNEDY,
Alderman.

[L. S.]

ARTHUR KIRK
vs.
JOHN DU BOIS. } Interference.

Supplemental Preliminary Statement of Arthur Kirk.

STATE OF PENNSYLVANIA,
County of Allegheny, } *ss:*

Arthur Kirk being duly sworn, deposes and says that he first illustrated his invention by drawings in January, 1880, and that he completed it in January, 1880.

ARTHUR KIRK.

Sworn to and subscribed before me, this 6th day of October, A. D. —.

JOHN S. KENNEDY,
Alderman.

[L. S.]

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Interference.

No. 8088.

Subject-matter: Movable dams.

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2. August 18, 1881, stipulation.
3. August 19, 1881, office letter.
4. September 19, 1881, statement of Du Bois.
5. September 23, 1881, statement of Kirk.
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7. September 24, 1881, office to Du Bois—time allowed for amendment to October 5, 1881.

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8. October 3, 1881, request of Kirk.
9. " 3, " " " Du Bois.
10. October 4, 1881, office letter.
11. " 8, " statement of Kirk.
12. " 13, " " " Du Bois.
13. " 19, " " " "
14. " 26, " notice of hearing.
15. November 28, 1881, stipulation.
16. " 29, " office letter.
17. January 13, 1882, record for Kirk.
18. " 14, " testimony for Kirk.
19. February 11, 1882, decision.
20. " " " notice of decision.

1881.

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Statement August 23, 1881.

July 23, 1881, declaration.

August 19, 1881, preliminary hearing postponed to September 22, 1881.

September 24, 1881, preliminary hearing postponed to October 5, 1881, and f. n.

October 4, 1881, preliminary hearing postponed to October 15, 1881, and f. n.

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February 11, 1882, decided in favor of Kirk op. n. Limit of appeal twenty days.

353 COMPLAINANT'S EXHIBIT KIRK FILE-WRAPPER AND CONTENTS.

DEPARTMENT OF THE INTERIOR,
UNITED STATES PATENT OFFICE.

To all persons to whom these presents shall come, Greeting:

This is to certify that the annexed is a true copy from the files of this office of the file-wrapper and contents in the matter of the letters patent granted Arthur Kirk, December 5th, 1882, number 268,411, for improvement in movable dams.

In testimony whereof I, Benton J. Hall, Commissioner of Patents, have caused the seal of the Patent Office to be affixed this
[o. s.] 9th day of May, in the year of our Lord one thousand eight hundred and eighty-seven, and of the Independence of the United States the one hundred and eleventh.

BENTON J. HALL,
Commissioner.

354 PITTSBURGH, *April 28th*, 1882.

To the Commissioner of Patents.

SIR: Please recognize F. W. Ritter, Jr., as associate attorney in the prosecution of the application of Arthur Kirk, improvement in movable dams, filed May 31st, 1881, serial No. 34648.

BAKEWELL & KERR,
Attorneys for Applicant.

PITTSBURGH, *May 27th*, 1881.

To the Commissioner of Patents.

SIR: Enclosed please find the specification, drawings and our check for $15, first fee in the following application for patent.

ARTHUR KIRK.

Improvement in movable dams.

Respectfully, BAKEWELL & KERR.

Petition.

To the Commissioner of Patents:

The petition of Arthur Kirk, of Sharpsburg, in the county of Allegheny and State of Pennsylvania, respectfully represents: That your petitioner has invented a new and useful improvement in movable dams, which he verily believes has not been known or used prior to the invention thereof by your petitioner; he therefore prays that letters patent of the United States may be granted to him therefor, vesting in him and his legal representatives the exclusive right to the same upon the terms and conditions ex-
355 pressed in the act of Congress in that case made and provided, he having paid fifteen dollars into the Treasury and complied with the other provisions of the said act.

He further prays that William Bakewell, Thomas B. Kerr and James K. Bakewell, constituting the firm of Bakewell & Kerr, of

the city of Pittsburgh, Pa., may be recognized as his attorneys in the matter of this application for a patent, hereby authorizing them or their accredited agent to transact all business with the office relative thereto; to sign the name of the petitioner to the drawings; to alter and amend the specification; to withdraw the application, or to appeal in case of rejection, as they may deem advisable; to receive the patent when granted, and generally to do all matters and things needful in the premises, as fully to all intents and purposes, as your petitioner could do.

ARTHUR KIRK.

Specification.

To all whom it may concern:

Be it known, that I, Arthur Kirk, of Sharpsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful improvement in movable dams, and I do hereby declare the following to be a full, clear and exact description thereof:

My invention relates to improvements in the construction of movable dams and locks whereby they are stronger, safer, more durable and more easily operated than those heretofore in use. By my improvements, defects heretofore existing in the old bear-trap plan are overcome. My invention consists:

1. [In building the dam or foundation, either wholly or partially, of boards, or planks or wood (or sheets of iron) in layers which break joint with each other, or at right angles to or across each other.—Amendment May 2, 1882.]

[2.] In constructing the foundation with several floors having intervening spaces which are divided into compartments by
356 partitions of any desired height formed by boards laid alternately at an angle to each other, *so arranged as to cross at intervals* [amendment May 2, 1852] and then fitting the spaces between the boards with cement and the compartments with sand, gravel, stone or other suitable material:

[3.] 2. In extending the ends of the top floor several feet beyond the foundation to protect the latter from percolation *or wash* of the water; *which undercuts the foundation.*—[Amendment May 2, 1882.]

[4. In providing the top of the upper end of the lower gate with a friction roller upon which the upper gate rests, so that in opening and closing, the upper gate shall move upon it.—Amendment May 2, 1882.]

[5.] 3. Of an improved dam gate consisting of a double journal or pintle bolted to one part, with each journal working in one end of a double-ended sleeve on the other part, the said parts being respectively bolted to the gate or foundation, and each pintle works in the adjoining ends of two sleeves, so that as long a hinge as is desired is made by simply adding duplicates of the parts named.

[6.] 4. Of a rising gate or gates provided with a telescoping joint, which permitting a limited movement will enable the gates to accommodate themselves to any unequal settling of the foundation.

[7. Of a water-tight journal between the end of the moving gate and the abutment.—Amendment May 2, 1882.]

[8.] 5. Of an open sluice, water-way or tail race, so arranged relatively to the dam, that the water which is not required to support the leaves will escape and so relieve the dam of all unnecessary pressure.

[9.] 6. In supports or props hinged to the foundation under the gates for use in supporting the gates in case of repairs.

[10.] 7. In operating the wickets by levers connected to pistons actuated by hydraulic, air or steam pressure supplied from and controlled at a common point.

357 [11.] 8. In a moving signal connected to the rising gate and so arranged as to indicate the elevation of the dam.

[12.] 9. In use of wooden screws in those parts exposed to water.

And finally, in details of construction hereinafter set forth—[Amendment May 2, 1882.]

To enable others skilled in the art to make and use my invention, I will now describe the same by reference to the accompanying drawing (three sheets), in which—

Figure 1 is a vertical cross-section of the dam and foundation, the gates being down.

Figure 2 is a like view of the gates when up.

Figure 3 is a detail view illustrating the construction of the foundation.

Figure 4 is a view of one form of the relieving tail race.

Figure 5 is a section of a portion of one of the gates showing the telescoping joint and the water-tight joint between the end of the dam and the abutment.

Figure 6 shows the use of the wooden screws in the construction of the gates.

Figures 7 and 8 are sectional views of the gate hinge.

Figure 9 illustrates the manner of operating the wickets from one point by steam, air, gaseous or water pressure.

Figure 10 is a view of the signaling apparatus.

Like letters of reference indicate like parts in each.

The foundation 1, the gates 2 and 3 and lower wall 4 are made of boards or planks of wood (or sheets of iron) in longitudinal and transverse courses 5 and 6 of irregular length and width, so that the boards of each longitudinal *or* [amendment May 2, 1882] transverse course shall break joint with those of other longitudinal or transverse courses. This construction does away with the necessity of preparing the timber to any particular size or shape, and makes a stronger and more compact structure than can be obtained in the use of solid cut timber.

The foundation 1 is constructed of several distinct floors, 7, 8 and 9. The first floor 7 rests on the transverse timbers 10,
358 and is composed of three or more longitudinal and transverse courses of boards 5 and 6. Above the floor, 7, are a number of compartments 11 of any desired size formed by partitions 12, made of boards or planks 13, 14 (figure 3) crossing each other *at intervals* [amendment May 2, 1882] and piled to any de-

sired height, *to form pents*,—[amendment May 2, 1882.] The spaces 15 left between the parallel boards of the lateral ones are filled or closed with cement to make them water-tight, and then the compartments 11 are filled with stones, gravel, sand or other heavy material. The second floor 8 is similar in construction to floor 7 and covers the compartments 11. Above it other compartments 16 similar to compartments 11 are formed by building the partions 12 up to the desired height. The spaces 15 are then closed with cement and the compartments filled with stone or other suitable material, the same as compartments 11. The third or top floor 9 is made in the same way as the floors 7 and 8, but preferably thicker and with the ends extended beyond the substructure, up and down stream as at 61, to prevent the foundation being damaged by the percolation or reaction of the water into and through it, *which might occur if the wash or waves struck immediately against the substructure.*—[Amendment May 2, 1882.]

The gates 2 and 3 are constructed as described, of longitudinal and transverse courses of boards or planks 5 and 6 which break joint with each other. These gates are of any desirable length, being made long enough to extend across the stream. This is possible by reason of the boards or planks of which they are formed overlapping each other, so that in fact there need be no limit to the length of the dam. The gates are hinged so that the upper one 2 overlaps the end of the lower one 3 whether open or closed. In order to relieve the friction of the lower gate on the upper one, in opening and closing, I provide the lower one 3 with a friction roller or rollers 17 at its outer upper edge.

The gate 3 is hinged to the foundation 1, and when closed lies flat near the floor 9. The gate 2 is hinged to a wall 4 at such a height that when closed it shall be horizontal or nearly so and rest
359 upon the gate 3. Undes the gates and hinged to the foundation at 18 are pivotted supports 19 used for sustaining the gates in an open position to facilitate repairs, as shown in figure 2. When not in use the supports 19 are laid flat on the floor 9 as shown in figure 1.

The hinge (figures 7 and 8) is of novel construction. The eye 20 is bolted to the foundation. The pintle 21 is bolted to the gate. It consists of a plate 22 by which it is bolted to the gate or gates, a central web 23 and a pintle 21 extending both ways from the central web, forming two pintles 24. Each pintle 24 enters the recess 25 of one end of the eye or socket piece. The socket piece 20 is like a section of a tube having a central division wall so as to strengthen and divide it into two parts. The pintles 24 enter the adjacent ends 25 of each of two socket pieces 20 and the socket pieces are secured firmly in place by bolts 26, and the pintle pieces by bolts 27. The upper side is cut away, as at 28, to provide room for the web 23 while below the edges meet. On the under side are projections 29, which are let into the foundation. This hinge is strong, cheap and durable, and the parts fit together so as to be water-tight. By simply adding other pieces it can be extended to any desirable length. I prefer to make the meeting edges serrated or of equiva-

lent form, so that the water which enters between them is caused to act as a packing to the joint and seal it.

The gate or gates 2 and 3 are provided with telescoping section or joint 30 (see figure 5), which is formed by cutting the longitudinal courses of timber off with an even edge, as at 31, across the gate, and the transverse courses in like manner, as at 32, back of the ends 31, of the longitudinal timbers. The part between the two cuts 31 and 32 is not bolted, so that the interleaved ends are free to move on each other, and in case of the settling of the foundation 1 at any point, the gate parting slightly, as at 30, is able to accommodate itself thereto. Heretofore the rigid structure of the gates caused them to stand straight and not follow the foundation in case
360 of its sinking. The joint 30 is water-tight and is simple in form and construction, easy and effective in operation.

At the ends of the dam I form a water-tight joint between the gate or gates and the stationary abutment 33, by means of a movable timber or piece 34 running transversely of the gate in a recess on its edge. Back of the timber 34 is a recess or channel 35 which communicates to the water above by a large inlet opening 36 at the upper end, and has a smaller discharge opening 37 at the lower end. The water from above, entering the channel 35 by the large opening 36 causes the piece 34 to be pressed out against the wall 33, and form a tight joint therewith. The water escapes from the channel 35 by the small exit 37. There is little friction between the piece 34 and the wall 33 because as soon as the gate 2 begins to descend, the pressure on 34 is relieved, and it falls back in the recess 35. The discharge 37 is to prevent the collection of sediment in the recess 35, which might prevent the working of the piece 34.

In the end of the wall of the dam I make an open sluice waterway or tail race 38 (figure 2), at such height as will permit all water which is not required to sustain the gates to escape from under them. When the gates are down, as in the position shown in figure 1, the water is admitted by the wickets under them. This raises and floats them up until they reach the position shown by figure 2. By that time the water, having reached the sluice 38, which passes through the wall around the end of the gate, will flow freely through, sustaining the gates at that level. A modified construction of the sluice 38 is shown by figure 4, where the outlet 39 in the wall is below the level of the water, the latter passing through the outlet 39 into a fore bay or well 40 and thence over the bridge 41. If desired the discharge opening may be controlled by a valve operated by a float. It is apparent that the form, place and details of construction of the sluice for relieving the gates from excessive pressure below, can be varied by the skilled constructor, but in all cases an open channel will be necessary when the water has reached a certain height or pressure under the gates.

361 I bring the operation and control of the wickets for admitting and discharging the water to and from the dam to one spot and put it under the control of one man. To the shaft of each wicket 42 (figure 9) I attach a lever 43, the other end of which is connected to a piston 44, working in a cylinder 45, from which a

pipe 46 leads to the operator's stand 47. The pipe 46 is connected to a compressed-air tank 48 and is controlled by a suitable cock 49. All of the wickets are similarly connected. The operator having the cocks all within reach can open and close the wickets at pleasure and with uniformity. I thus save in labor and time, and secure great efficiency of operation. I prefer to use a three-way cock and a vacuum cylinder 50 for relieving the pressure on the pistons 44, as thereby the action is more prompt. I can use steam, water or other liquid or gaseous medium for actuating the pistons, by simply adapting the apparatus thereto.

I have also devised an automatic signal which shall show the exact height and position of the dam. On the end wall I erect a frame of posts 51 and 52 and cross-piece 53. A stationary lantern 54, flag or other signal, is placed on the cross-piece 53 at a suitable point. A rope or chain 56, is fastened to the outer end of the rising gate 2 and passes up over pulleys 57, placed at the corners of the framing, and is provided with a weight 58 at the other end. A lantern, 59, or other signal, is fastened to the chain 56 in such relation to the signal 54 that upon the rising or falling of the gate 2 it shall change its relative position to the signal 54 and thereby clearly indicate the exact position of the gate or dam. The operation of the signal by the moving of the gate itself insures absolute accuracy and great consequent safety.

The planking of the various parts of the foundations and gates which are exposed to water is fastened by wooden screw-bolts 60, figure 6, the threads of the male screw being preferably of a quicker pitch than that of the female screw, so as to force the parts tightly together. The bolts are made of dry or partially dried wood, and when exposed to the water will swell and make a very tight fastening.

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I am aware that the crib-work has heretofore been constructed of timber upon a float or floor composed of several courses of dressed planking or timber; and also that guards and a horizontal apron have been arranged on the down-stream side of a dam to arrest the silt and detritus and prevent the undermining of the dam by the backwash of the water, and do not herein claim the same, but [amendment June 1, 1882.]

What I claim as my invention and desire to secure by letters patent is:

[1. A dam or dam foundation constructed of alternating longitudinal and transverse courses of timber, which break joint with each other, substantially as, and for the purposes described.

2. A dam foundation constructed of several floors having intervening spaces divided into compartments which are fitted with stone or other suitable material, substantially as and for the purposes described.]

1. *A dam foundation composed of three or more floors constructed of transverse and longitudinal courses of timber, the spaces between the floors being divided into compartments which are filled with stone or like material, substantially as and for the purposes specified.* [Substituted May 2, 1882.] 1. *A dam foundation composed of two or more floors constructed of transverse and longitudinal courses of boards, the*

boards of the several courses arranged to break joint, the spaces between the floors being divided into compartments which are filled with stone or like material, substantially as and for the purpose specified. [Substituted June 1, 1882—cancelled October 23, 1882.]

[3.] [2.] 1. A dam foundation constructed of several floors, having intervening spaces divided into compartments by partitions formed of boards laid [across each other] *to cross each other at intervals* [amendment May 2, 1882,] and cemented between, and the compartments filled with stone or other suitable substance substantially and as for the purpose described.

363 [4. A dam foundation having the top or floor extended at the ends beyond the substructure, substantially as one and for the purpose, described.]

[3.] 2. *A dam foundation composed of two or more floors, the space between the floors being filled with stone or like material and the upper floor extending beyond the superstructure to prevent the wash and percolation of the water from undercutting the foundation, substantially as specified.* [Substituted May 2, 1882.]

[5. A dam composed of rising gates, the under of which has a friction roller or rollers in its end where the upper gate bears and works upon it, substantially as and for the purpose described.—Amendment May 2, 1882.]

[6.] [4.] 3. A dam-gate hinge, consisting of a double journal or pintle, bolted to one part, working in the adjacent ends of a double-ended sleeve secured to the other part on each side of it, said sleeve having a central partition to strengthen it and separate the two ends of the adjacent pintles, substantially as and for the purposes described.

[7.] [5.] 4. A rising dam gate or gates provided with a telescoping joint, substantially as and for the purposes described.

[8. A rising dam having a tight joint between the moving gates and the abutment, substantially as and for the purposes described.]

[6.] 5. *The combination with a dam gate and its abutment of a movable timber piece running transversely of the gate, and means substantially as specified for exerting a yielding pressure on the movable timber piece, whereby a tight joint between the abutment and gate is obtained substantially as and for the purpose specified.* [Substituted May 2, 1882.]

[9.] [7.] 6. A bear-trap dam having a relieving or open sluice, extending from under the gates, so as to relieve them from unnecessary pressure, substantially as and for the purposes described.

[10.] [8.] 7. A rising dam provided with hinged supports under the gates, substantially as and for the purposes described.

[11.] [9.] 8. The combination of the wicket stems with pistons connected thereto, cylinders, pipes leading to a common cen-

364 tral office, and controlling valves, whereby all the wickets may be operated by liquid or fluid pressure from a common center, substantially as and for the purposes described.

[12,] [10.] 9. The combination of a rising dam, with a signal chain or cord attached thereto and a lantern or other signal to indicate the condition of the dam by its change of position, substantially as and for the purposes described.

[13.] 10. A wooden dam or foundation, the courses of which are fastened by wooden screw-bolts, substantially as and for the purposes described.

In testimony whereof, I have hereunto set my hand.

ARTHUR KIRK.

Witnesses:
JOHN S. KENNEDY.
JOSEPH MOLL.

STATE OF PENNSYLVANIA, } ss:
County of Allegheney, }

Arthur Kirk, the above-named petitioner, being duly sworn, deposes and says that he verily believes himself to be the original and first inventor of the improvement in movable dam, described and claimed in the foregoing specification; that he does not know or believe that the same was ever before known or used; that he is a citizen of the United States and a resident of Sharpsburg, in said State of Pennsylvania; that the invention described and claimed in the annexed specification has not been patented to him or with his knowledge or consent in any foreign country.

Sworn to and subscribed before me, this 21st day of May, 1881.

[L. S.] JOHN S. KENNEDY, *Alderman.*

365 DEPARTMENT OF THE INTERIOR,
UNITED STATES PATENT OFFICE,
WASHINGTON, D. C., *June 25th*, 1881.

"Movable dams." Filed May 31, 1881. No. 34648.

Arthur Kirk, care Bakewell & Kerr, Pittsburg, Pa.:

This case has been examined, and the "first" part of the recital of invention page 2, lines 11–13, is not understood. As to the "second" part, the drawings fail to show the feature of the "boards laid alternately at an angle to each other;" moreover such description is inconsistent with the description relative to the filling of cement, if the boards are arranged as in the gates and floors. The description page 5, lines 4 to 11, is not clearly represented in the drawings. The reference to the "percolation" of the water, page 6, lines 14–16, is not understood. It is not seen how the construction described, lines 13–16, page 8, can have the function claimed. Changes as above indicated appear necessary. Regarding the claims, the first is met in patent No. 230,488, January 11th, 1881, and the second in No. 229,682, July 6th, 1880, to John Du Bois (canals).

Regarding claim 3, the drawings and description relative to the construction of the partitions must be cleared prior to favorable action. The 4th claim is met in patent No. 201,743, April 30th, 1878, J. M. McCue (dams). Claim 5 is anticipated in patent to M. S. Wheaton, April 3d, 1849 (dams). The 8th claim is met in patents No. 214,324, April 15th, 1879, Tainter & Parker, and No. 226,455, April 13th, 1880, T. Parker, (water gates). As to claim 9, it will probably involve an interference with a pending application now on file in this office. The 13th claim should be more specific to

avoid the presumption of mere double use, wood screws having been notoriously employed to unite parts in a great variety of structures.

Claims 1, 2, 4, 5, 8 and 13 are rejected.

B. W. POND, *Examiner.*

T. C. TIPTON,
Assistant Examiner.

366 DEPARTMENT OF THE INTERIOR,
UNITED STATES PATENT OFFICE,
WASHINGTON, D. C., *July* 22, 1881.

Arthur Kirk, care Bakewell & Kerr, Pittsburgh, Pa.:

Please find below a copy of a communication from the examiner concerning your application for a patent for "movable dams," filed May 31st, 1881, No. 34648.

Very respectfully,

E. M. MARBLE,
Commissioner of Patents.

Room No. 43.

Your case, above referred to, is adjudged to interfere with others hereafter specified, and the question of priority will be determined in conformity with the rules.

The statement demanded by rule 105 must be sealed up and filed on or before the 23d day of August, 1881, with the subject of the invention, and name of party filing it, indorsed on the envelope. The subject-matter involved in the interference is "In combination with a flexible dam or gate having means for conducting and maintaining water thereunder, an elevated overflow or discharge to limit the head of water passing beneath the dam."

The above subject-matter constituting the opposing applicant's first claim, once being substantially embraced in applicant's ninth claim.

The interfering application is that of John Du Bois, of Du Bois, Clearfield county, Pa., filed April 19th, 1881, No. 31228, and whose attorney is P. T. Dodge, of Washington, D. C.

B. W. POND, *Examiner.*

T. C. TIPTON,
Assistant Examiner.

367 PITTSBURGH, PA., *April* 22*d*, 1882.

In Arthur Kirk's application for patent for movable dam. Filed May 31st, 1881.

To the Commissioner of Patents.

SIR: The interference between the above application and that of John Du Bois was decided in favor of Kirk on February 11th, 1882. No appeal was taken from the decision.

We would be glad to have the case taken up and disposed of, and ask that it may be done at an early day.

Respectfully,

BAKEWELL & KERR,
Attorneys for Kirk.

Room 43.

DEPARTMENT OF THE INTERIOR,
UNITED STATES PATENT OFFICE,
WASHINGTON, D. C., *April 27th*, 1882.

"Movable dams." Filed May 31st, 1881. No. 34648.

Arthur Kirk, care Bakewell & Kerr, Pittsburgh, Pa.:

In reply to applicant's letter of the 22d inst., filed the 24th inst., he is informed that the case is awaiting his action in view of office letter of June 25th, 1881, which action still holds good.

B. W. POND, *Examiner.*

T. C. TIPTON,
Assistant Examiner.

To the Commisioner of Patents.

SIR: In the matter of the application of Arthur Kirk for improvements in "movable dams," filed May 31st, 1881, serial No. 34648, the case is amended as follows:

Page 2, cancel from "in building" on line 9 to end of line 13, inclusive.*

368 Page 2, line 18, after "other" insert "so arranged as to cross at intervals."

Page 2, line 22, erase "third," insert "second."

Page 2, line 24, after "percolation" insert "wash," and after "water" insert "which undercuts the foundation."

Page 2, erase from "fourth," on line 24, to "fifth," on line 29, inclusive, and insert "third."

Page 3, line 9, erase "sixth," insert "fourth."

Page 3, erase from "seventh" on line 13 to end of line 15, inclusive, and insert "fifth."

Page 3, line 20, erase "ninth," insert "sixth."

Page 3, line 23, erase "tenth," insert "seventh."

Page 3, line 27, erase "eleventh," insert "eighth."

Page 4, line 2, erase "twelfth," insert "ninth."

Page 4, after "water" line 3, insert "and finally in details of construction hereinafter set forth."

Page 5, line 9, after "longitudinal" insert "or."

Page 5, line 24, after "other" insert "at intervals."

Page 5, line 25, after "height" insert "to form pens."

Page 6, after "it," line 16, insert "which might occur if the wash of waves struck immediately against the substructure."

Cancel 1st and 2d claims and insert—

1. A dam foundation composed of three or more floors, constructed of transverse or longitudinal courses of timber, the spaces between the floors being divided into compartments which are filled with

*The numbers of pages and lines herein refer to the record and not to the reprint in this book where the amendments have been incorporated into the body of the specification.

stone or like material, substantially as and for the purpose specified.

Claim 3, line 4, erase "across each other" and insert "to cross each other at intervals."

Cancel 4th claim and insert—

3. A dam foundation composed of two or more floors, the space between the floors being filled with stone or like material, and the upper floor extending beyond the substructure to prevent the wash and percolation of the water from undercutting the foundation, substantially as specified.

Cancel 5th claim.

369 Cancel 8th claim and insert—

6. The combination with a dam gate, and its abutment, of a movable timber piece running transversely of the gate, and means substantially as specified for exerting a yielding pressure on the movable timber piece, whereby a tight joint between the abutment and gate is obtained substantially as and for the purpose specified.

Renumber the claims.

Figure 3 clearly shows the boards forming the partitions or pens of the crib arranged only to cross at intervals so as to leave spaces which must be filled with cement when sand or like material is used, and also to prevent the water from washing through the compartments.

McCue's patent, No. 203,174, is no answer for the projecting floor of applicant, as it shows simply an apron arranged on the down-current side of a dam to catch the overflow and prevent the silt from being washed away. A reconsideration is asked.

Very respectfully,

A. KIRK,
By F. W. RITTER, JR.,
Associate Attorney.

Washington, D. C., May 2d, 1882.

Room 43.

DEPARTMENT OF THE INTERIOR,
UNITED STATES PATENT OFFICE,
WASHINGTON, D. C., *May* 11, 1882.

"Movable dams." Filed May 31st, 1881. No. 34648.

Arthur Kirk, F. W. Ritter, Jr., present:

Claim 1 of amendment filed May 2d, is anticipated in patent No. 229,682 to "Du Bois," heretofore cited.

If the 3d claim is to stand, the construction adopted by "McCue" must be fully recognized.

The 1st claim is rejected.

B. W. POND, *Examiner.*

T. C. TIPTON,
Assistant Examiner.

370 To the Commissioner of Patents:

SIR: In the matter of the application of Arthur Kirk for improvements in "movable dams," filed May 31st, 1881, serial No. 34648, the case is further amended as follows:

Before preamble to claim insert—

I am aware that the crib work has heretofore been constructed of timber upon a float or floor composed of several courses of dressed planking or timber; and also that guards and a horizontal apron have been arranged on the down-stream side of a dam to arrest the silt and detritus and prevent the undermining of the dam by the backwash of the water, and do not herein claim the same, but—

Cancel the present first claim and insert—

1. A dam foundation composed of two or more floors constructed of transverse or longitudinal courses of boards, the boards of the several courses arranged to break-joint the spaces between the floors being divided into compartments which are filled with stone or like material, substantially as and for the purpose specified.

In asking a reconsideration of the case as now presented we would say that a fair disclaimer has been entered to what is shown and described by Du Bois and McCue.

Applicant's foundation is formed by three floors made of rough boards arranged to break joints with each other, and the boards of one course arranged to break joints with those of the next. The spaces between the floors are divided up into compartments wherein rock, sand, &c., *is* placed, and the close floors prevent the displacement of this ballast or filling. The construction adopted by applicant permits the use of any kind of knotty or refuse boards. Thus cheapening the structure as well as rendering it closer, better knit, more compact, and permitting the use of cheaper and smaller fastenings in lieu of the large bolts Du Bois is compelled to use. It is thought the present 1st claim presents sufficient novelty and
371 value to entitle it to favorable consideration. The recognition of McCue to relieve the 3d claim has been made.

Very respectfully,
A. KIRK, JR.,
By T. W. RITTER, JR.,
Associate Attorney.

Washington, D. C., June 1, 1882.

Room No. 43.

DEPARTMENT OF THE INTERIOR,
UNITED STATES PATENT OFFICE,
WASHINGTON, D. C., *June 14th*, 1882.

"Movable dams." Filed May 31st, 1881. No. 34648.

Arthur Kirk, care F. W. Ritter, Jr., present:

The new first claim, filed the 1st inst., does not differ materially from the one for which it was substituted and is met in the Du Bois patent heretofore cited (No. 229,682), and is therefore rejected.

POND, *Examiner.*

T. C. TIPTON,
Assistant Examiner.

Honorable E. M. Marble, Commissioner of Patents.

SIR: In the matter of the application of Arthur Kirk, for improvements in "movable dam," filed May 31st, 1881, serial No. 34648, the case is amended as follows:

Cancel the 1st claim.

Renumber the remaining claims.

In *with* withdrawing the subject-matter of the present 1st claim, applicant reserves to himself the right to make a new application for the same.

Very respectfully,

ARTHUR KIRK,
By F. W. RITTER, JR.,
Associate Attorney.

Washington, D. C., October 23, 1882.

372 Issue division. Serial No. 34648.

DEPARTMENT OF THE INTERIOR,
UNITED STATES PATENT OFFICE,
WASHINGTON, D. C., *Oct.* 7, 1882.

Arthur Kirk, care F. W. Ritter, Jr., associate.

SIR: Your application for a patent for an improvement in movable dams, filed May 31st, 1881, has been examined and allowed.

The final fee, twenty dollars, must be paid, and the letters patent bear date as of a day not later than six months from the time of this present notice of allowance.

If the final fee is not paid within that period the patent will be withheld, and your only relief will be by a renewal of the application, with additional fees, under the provisions of section 4897, Revised Statutes. The office aims to deliver patents upon the day of their date, and on which their term begins to run; but to do this properly applicants will be expected to pay their final fees at least twenty days prior to the conclusion of the six months allowed them by law. The printing, photolithographing, and engrossing of the several patent parts, preparatory to final signing and sealing, will consume the intervening time, and such work will not be done until after payment of the necessary fees.

When you send the final fee you will also send, distinctly and plainly written, the name of the inventor and title of invention as above given, date of allowance (which is the date of this circular), date of filing, and, if assigned, the names of the assignees.

If you desire to have the patent issue to assignees, an assignment containing a request to that effect, together with the fee for recording the same, must be filed in this office on or before the date of payment of final fee.

Additional copies of specifications and drawings will be charged for at the following rates: Single copies, uncertified, 25 cents;
373 twenty copies or more, 10 cents each. The money should accompany the order.

Very respectfully,

E. M. MARBLE,
Commissioner of Patents.

Memorandum Fee Paid at United States Patent Office.

Serial number 34648.
Inventor: Arthur Kirk.
Patent to be issued to: Arthur Kirk.
Name of invention, as allowed: Movable dams.
Date of payment: November 8th, 1882.
Fee: Final fee, $20.
Solicitors: Bakewell & Kerr.
Date of filing: ——.
Date of circular of allowance: October 27th, 1882.
Send patent to: Bakewell & Kerr, Pittsburgh, Pa.

Serial number 34648.
Examiner book No. 107–502.

1881.

Patent No. 268,411.
Arthur Kirk, of Sharpsburg, county of Allegheny, State of Pennsylvania. Invention "movable dams."

Parts of application filed.
- Petition May 31, 1881.
- Affidavit May 31, 1881.
- Specification May 31, 1881.
- Drawing 3 sheets May 31, 1881.
- Model not required.
- Specimen.
- First fee, cash $15, May 31, 1881.
- First fee certified.

374 Application filed complete May 31, 1881.
Examined October 25th, 1882, Pond, ex.
Countersigned: J. W. Bobson, October 26th, 1882, for Commissioner.
Notice of allowance, October 27th, 1882.
Final fee, cash $20, November 10th, 1882.
Final fee certified.
Patented December 5th, 1882.
Attorney or P. O. address, Bakewell & Kerr, Pittsburgh, Pa.
F. W. Ritter, Jr., associate, present.

1881.

Contents.

Application papers.

1. June 25th, 1881. Rejection.
2. July 22d, 1881, X 97—356.
3. Decided in favor of 107—502, February 11th, 1882.
4. Letter, April 24th, 1882.
5. April 27th, 1882. Letter.
6. Amendment A, B, C, D, E, May 2d, 1882.

7. May 11th, 1882. Rejection.
8. Amendment F, G, June 1st, 1882.
9. June 14th, 1882. Rejection.
10. Answer to reasons of appeal. July 12, 1882.
11. Amendment October 23d, 1882.

Title: Improvement in movable dams.
A. C. W.
N. L. M.

375 EXHIBIT RITTER LETTER.

William Bakewell. James K. Bakewell. Thomas W. Bakewell.

Offices of W. Bakewell & Sons, 110 Diamond street, room 70.

PITTSBURGH, *June 24th*, 1887.

ARTHUR KIRK
vs.
JOHN E. DU BOIS.

F. W. Ritter, Jr., Esq.

DEAR SIR: We have received from Mr. T. H. B. Patterson a copy of written cross-interrogatories, which he wishes to have you answer. They will be sent to Mr. Duryee by the clerk of the court. Will you please arrange with Mr. Duryee for a meeting at as early a day as convenient?

You will, doubtless, consider some of the questions to be unwarrantably personal and insolent.

Yours very truly, W. BAKEWELL & SONS.

376 DU BOIS' EXHIBIT DEED.

John Du Bois
to
John E. Du Bois. } Deed.

Recorded in Deed Book 160, 38, page 119.

This indenture, made the seventeenth day of January, in the year of our Lord one thousand eight hundred and eighty-four, between John Du Bois, of Du Bois, in the county of Clearfield and State of Pennsylvania, of the first part, and John E. Du Bois, of the same place (the said John E. Du Bois being a nephew of John Du Bois, the party of the first part), of the second part: Witnesseth that the said party of the first part for and in consideration of the sum of one dollar (as well as certain other good and valuable considerations) lawful money of the United States of America, unto him well and truly paid by the said party of the second part at or before the sealing and delivery of these presents, the receipt whereof is hereby acknowledged, hath granted, bargained, sold, aliened, enfeoffed, released, conveyed and confirmed, and by these presents doth grant, bargain, sell, alien, enfeoff, release, convey and confirm unto the

said party of the second part, his heirs and assigns, all the land, tenements and hereditaments which the said party of the first owns, holds or has title to, wherever the same may be, in any and every county, state, territory or country upon the earth, of every nature and description whatever. Also all the personal property, goods, chattles, notes, bonds, book accounts, rights, credits and assets, real, personal
377 and mixed, which belong to the party of the first part, or in any way appertains to him, of every nature and character whatever, wherever the same may be or may be found as a part of the consideration for the sale and conveyance of the above property. John E. Du Bois, the party of the second part, hereby covenants, agrees and obligates himself to pay, and fully discharge all debts, notes, obligations, covenants, contracts and damages of every nature and character whatever, whether arising or accruing from contracts or torts of the said John Du Bois, party of the first part, and also all such notes, obligations, debts, damages or contracts of the said John Du Bois, party of the first part, executed, made or incurred at any time in the future, till the day of his death, by the said John Du Bois, and for the full and faithful performance of this covenant of the party of the second part, all the real estate above conveyed is hereby charged in the hands of the party of the second part, his heirs or assigns, and any and all the obligations of the above covenants may, by the holders or owners of the rights of action which may be or are embraced in the above covenant, be sued for and recovered off the said John E. Du Bois by suit brought directly against him with the intervention of the name of John Du Bois or any administrators on his estate, and it is hereby made and express condition in this deed and sale or land and personality, that in case John E. Du Bois, the party of the second part, shall die before John Du Bois, the party of the first part, then in that event this deed, sale and conveyance and all the covenants herein shall be null and void, and all the property, real, personal and mixed, above sold and conveyed, shall be and become fully revested in John Du Bois, his heirs and assigns forever; together with all increments accruing thereon or therefrom; together with all and singular the buildings, improvements, ways, waters, water-courses, rights, liberties, privileges, hereditaments, and appurtenances whatsoever thereunto belonging, or in anywise appertaining, and the reversions and remainders, rents issues and profits thereof, and all the estate, right, title, interest, property,
claim and demand whatsoever of the said party of the first part
378 in law, equity or otherwise howsoever of, in and to the same and every part thereof; to have and to hold the said lands, tenements, property, hereditaments and premises hereby granted or mentioned and intended so to be, with the appurtenances unto the said party of the second part, his heirs and assigns, to and for the only proper use and behoof of the said party of the second part, his heirs and assigns forever, subject to the foregoing conditions and charged with the foregoing covenants; and John Du Bois, the said party of the first part, for himself, his heirs, executors, administrators, does, by these presents, covenant, grant and agree to, and with the said party of the second part, his heirs and as-

signs, that he, the said party of the first part and his heirs, all and singular, the hereditaments and premises hereinabove described and granted, or mentioned and intended so to be with the appurtenances, unto the said party of the second part, his heirs and assigns, against him, the said party of the first part, and his heirs, and against all and every other person or persons whomsoever, lawfully claiming or to claim, the same or any part thereof, shall and will warrant and forever defend. In witness whereof the said parties of the first part and second to these presents set their hands and seals. Dated the day and year first above written.

JOHN DU BOIS. [SEAL.]
JOHN E. DU BOIS. [SEAL.]

Signed, sealed and delivered in the presence of us—
JAS. K. HAMILTON.

Received the day of the date of the above indenture, of the above-named John E. Du Bois, the sum of one dollar, lawful money of the United States, being the consideration money above mentioned.

JOHN DU BOIS.

Witness:
JAS. K. HAMILTON.

STATE OF PENNSYLVANIA, } ss:
County of Jefferson, }

On this seventeenth day of January, A. D. 1884, before me,
379 a justice of the peace, in and for said county, personally came the above-named John Du Bois and John E. Du Bois, and acknowledged the foregoing indenture to be their act and deed, desiring the same to be recorded as such.

Witness my hand and seal the day and year aforesaid.

JAS. K. HAMILTON, [SEAL.]
Justice of the Peace.

Recorded April 26, A. D. 1886.
GEO. M. FERGUSON, *Recorder.*

STATE OF PENNSYLVANIA, } ss:
County of Clearfield, }

I, D. R. Fullerton, recorder of deeds, in and for said county, do hereby certify that the foregoing deed, John Du Bois to
[o. s.] John E. Du Bois, is a true and correct copy of the same, as full and entire as the same remains of record in Deed Book No. 38, page 119.

Witness my hand and official seal this first day of April, A. D. 1887.

D. R. FULLERTON, *Recorder,*
Per ED. KAUFFMAN, *D'p.*

380 DU BOIS' EXHIBIT WILL.

Will of John Du Bois.

I, John Du Bois, of Du Bois, in the State of Pennsylvania, do hereby make and publish this, my last will and testament, hereby revoking any and all previous will or wills by me made. I hereby give, devise and bequeath to my nephew, John E. Du Bois, all my property, goods, chattels and estate, real, personal or mixed, of every nature and kind, wheresoever situated, to him, his heirs and assigns forever. And I hereby appoint said John E. Du Bois sole executor of this, my will.

As witness my hand and seal this 26th day of January, A. D., 1885.

JOHN DU BOIS. [SEAL.]

Signed, sealed published and declared by the above named John Du Bois, as and for his last will and testament in the presence of us, who have hereunto subscribed our names as witnesses thereto in his presence and in the presence of each other.

CADMUS Z. GORDON.
E. H. CLARK.

381 CLEARFIELD COUNTY, *ss:*

Personally appeared before me, Geo. M. Ferguson, register for the probate of wills and granting letters of administration in and for said county, L. M. Truxal, who, being duly sworn ac-
[o. s.] cording to law, doth depose and say that John Du Bois, late of the borough of Du Bois, said county, died at his residence on or about the 5th day of May, A. D. 1886, at 4.43 o'clock p. m. of said day, to the best of his knowledge and belief.

L. M. TRUXAL.

Sworn and subscribad before me this 18th day of May, A. D. 1886.

GEO. M. FERGUSON, *Register.*

CLEARFIELD COUNTY, *ss:*

REGISTER'S OFFICE, *May 18th*, 1886.

There personally appeared Cadmus Z. Gordon and E. H. Clark, the subscribing witnesses to the foregoing last will and testament of John Du Bois, deceased, and on their solemn oaths did say that they were present, and did see and hear John Du Bois, deceased, the testator therein sign, seal, publish and declare the same as and for his last will and testament, and that at the doing thereof he was of sound disposing mind, memory and understanding to the best of their knowledge and belief.

CADMUS Z. GORDON.
E. H. CLARK.

Sworn and subscribed before me the date above, May 18th, 1886.
[o. s.] GEO. M. FERGUSON, *Register.*

Will duly probated, proved and approved and letters testamentary granted to John E. Du Bois this 18th day of May, A. D. 1886.

GEO. M. FERGUSON, *Register.*

382 DU BOIS' EXHIBIT J.

DEPARTMENT OF THE INTERIOR,
UNITED STATES PATENT OFFICE.

To all persons to whom these presents shall come, Greeting:

This is to certify that the annexed is a true copy from the files of this office of the file-wrapper and contents in the matter of the letters patent granted John Du Bois, January 3d, 1882, number 251,771, for improvement in locks and dams.

In testimony whereof, I, M. V. Montgomery, Commissioner of Patents, have caused the seal of the Patent Office to be affixed this 8th day of February, in the year of our Lord one thousand eight hundred and eighty-six, and of the Independence of the United States the one hundred and tenth.

[o. s.]

M. V. MONTGOMERY,
Commissioner.

Petition.

To the Commissioner of Patents:

Your petitioner, a citizen of the United States, residing at Du Bois, Clearfield county, Pennsylvania, prays that letters pat-
383 ent may be granted to him for the improvement in locks and dams, set forth in the annexed specification.

And he hereby appoints Philip T. Dodge, of Washington, D. C., his attorney, with full power of substitution and revocation, to prosecute this application, to make alterations and amendments therein, to receive the patent, and generally to transact all business in the Patent Office connected therewith.

JOHN DU BOIS.

Oath.

STATE OF PENNSYLVANIA, } ss:
County of Clearfield, }

I, John Du Bois, the above-named petitioner, being duly sworn, depose and say that I verily believe myself to be the original and first inventor of the improvement in locks and dams described in the accompanying specification; that I do not know or believe that the same was ever before known or used; that the same has not been patented in any foreign country with my knowledge or consent; that the same has not been in public use or on sale in the United States for more than two years prior to this application, and that I am a citizen of the United States.

JOHN DU BOIS.

Sworn to and subscribed before me this 7th day of November, 1881.

J. P. TAYLOR, *J. P.* [SEAL.]

Specification.

Specification describing certain improvements in locks and dams, invented by John Du Bois, of Du Bois, in the county of Clearfield and State of Pennsylvania.

384 My present invention relates to improvements designed more particularly for use in connection with that system of dams and locks represented in letters patent heretofore granted to me, Nos. 229,682 and 236,488.

The objects of the present invention are, first, to prevent the flexible gates or dam sections from being subjected to an excessive or dangerous pressure of water from beneath; and, second, to permit the dam to adjust itself to slight variations or irregularities in the foundation, and to prevent the leakage of water past and between the various sections of which the lock or dam may be composed.

The first part of my invention for limiting water pressure beneath the gate or dam consists in the use of an overflow or discharge opening arranged in the flume or supply chamber in advance of the gate or dam, and at such height as to permit the escape of the water past the gate without entering beneath the same, whenever the desired limit of pressure is reached. My invention in this regard is restricted to an arrangement wherein the head of the water is regulated before it passes beneath the gate or dam, as contradistinguished from a system wherein the water is first passed beneath the dam or gate and then permitted to escape through a safety outlet.

By limiting the head of the water previous to its passage beneath the gate, I am enabled to secure better results and to make use of a much more simple construction than is required when the water is first passed beneath the gate and then permitted to seek a safety outlet.

The second part of the invention consists in a flexible dam, consisting of hinged overlapping leaves, each leaf composed of a series of sections arranged side by side, said sections being provided, when required, with packing in the adjacent edges.

Referring to the drawings—

Figure 1 is a longitudinal vertical section through a gate constructed on my plan.

Figure 2 is a top-plan view of the same.

385 Figure 3 is a cross-section on the line X-X, figure 2.

A represents my dam or gate consisting of leaves or sections *a*, *b* and *c*, connected and arranged as in my previous patent, so that they may be raised and lowered at their inner end, the elevation being effected by the admission of water into the space or chamber beneath the gate in order to force the same upward. Under the construction represented in my previous patents a possibility existed of the gates being subjected to an excessive and dangerous pressure in the event of the water above the dam attaining an excessively high head or elevation. In order to avoid this danger I now provide the flume *B*, through which the water is intro-

duced to and discharged from the space beneath the gate, with transverse bulkheads, *c*, *d*, containing gates or wickets *e*, *f*, serving respectively to control the admission or passage of water to and from the gate. Water being admitted beneath the gate elevates the same, and, at the same time, rises within the flume or supply chamber above the lower bulkhead *d*, the gates *f* being closed to maintain a limited head of water beneath the gate. In the supply chamber *B*, in advance of or above the bulkhead *d*, I form a lateral discharge or overflow chamber *h*, through the top of which the water may escape from the flume or supply chamber whenever the fixed limit of elevation is attained.

The inner side of the discharge or overflow chamber *h*, from which the water flows to escape, is composed of a series of planks *i*, seated one upon another in grooves in the frame. By adding planks to or removing them from the series the height of the overflow wall may be increased or diminished to any extent desired; and in this way the elevation of the water and the consequent elevation of the dam may be fixed at any point, it being manifest that as soon as the water reaches an elevation at which it can escape from the chamber *h*, the elevation of the dam will cease. Thus it will be seen the head of the water is regulated previous to its reaching the gate, preventing the possibility of the latter receiving an excessive strain. It will be observed that under
386 my system of construction the surplus water instead of passing beneath the gate to be discharged escapes directly through the flume, past the gate, without entering thereunder.

I am aware that an attempt has been made to protect gates, of the class herein described, from excessive pressure by providing at a suitable elevation an outlet or waste opening through which the surplus water can escape from beneath the gate after it has reached the desired limit of elevation, and this plan I do not claim.

I find in practice that a more simple construction is permitted and a more reliable action is secured by providing an outlet through which the surplus water may escape before reaching the gate. Instead of using the removable planks as a means of regulating the height of the water, a vertically sliding gate or any equivalent arrangement may be employed to regulate the height of the water.

Passing now to the construction of the dam, it will be seen that each leaf instead of being made in one continuous length as in my previous patents, is composed of a number of sections arranged side by side. The sections of each leaf are arranged to overlap the joints or break joints with the sections or the other leaf or leaves as represented in figure 2 of the drawing. It will readily be seen that by arranging the sections of each leaf to overlap the joints of the leaves of the continuous sections, the dam, when of great length, is given a limited amount of flexibility, while at the same time the sections of the leaves are caused to remain substantially in line with each other, and the individual sections prevented from rising or falling out of their proper position.

In order to prevent leakage between the sections of the leaves their adjacent edges are provided with packing strips of any suit-

able character. The packing represented in the drawing consists of a wooden strip or bar *j*, inserted into the edge of one section and forced outward by means of a spiral spring against the edge of the adjoining sections, as clearly represented in figures 2 and 3. In
387 place of the spiral spring flat springs may be used, or water may be admitted through openings in the interior of the dam to the space behind the packing strips for the purpose of forcing them outward; and in place of the wood, strips of rubber or of wood faced with rubber, may be substituted.* *I do not claim broadly herein the combination with a flexible dam or gate of an overflow by which the water can escape after reaching a fixed limit of elevation, the same constituting the subject-matter of a prior application.* [Amendment, December 8, 1881.]

Having thus described my invention, what I claim is:

1. In combination with a flexible dam or gate having means for conducting and maintaining water thereunder, an overflow or discharge to limit the head of the water located at a point in advance of the gate, whereby the surplus water is permitted to escape before reaching the gate.

2. The combination of a jointed or flexible gate elevated by the admission of water thereunder and a vertically adjustable outlet to limit the head of the water acting beneath the gate or dam, whereby the gate may be caused to stop automatically at any desired height.

3. In combination with the flexible dam, the flume *B* and wickets *f* a discharge or overflow chamber *h* arranged in connection with the flume, substantially as shown.

4. In combination with the dam *A*, flume *B*, and means for retaining a head of water in the flume and beneath the dam, the overflow chamber *h* provided with movable boards *i*.

5. The flexible dam or gate consisting of hinged overlapping leaves, each leaf composed of a series of sections arranged side by side and provided with packing seated in grooves in their adjacent edges, substantially as shown.

6. A flexible dam or gate consisting of co-operating leaves, each leaf composed of a series of sections, the sections of one
388 leaf arranged to overlap or break joint with the sections of the other leaf, substantially as described.

JOHN DU BOIS.

Witnesses:
JOSEPH PERRY TAYLOR.
GEORGE RICHARD VOSBURG.

John Du Bois, locks and dams. November 9, 1881. Application for patent.

Honorable Commissioner of Patents:

SIR: The above-entitled application is a division of one heretofore filed by applicant and now involved in the interference of Kirk *vs.* Du Bois. It will be seen on examination that the present case

* In these specifications matter inserted by amendment is italicised and matter cancelled is contained in brackets.

embraces only matters which are not involved in the interference and are neither shown nor described in the application of Kirk. In Kirk's case the only arrangements shown or described are those in which the water is first admitted beneath the dam and then permitted to escape through a separate overflow opening at the end of the same. This arrangement applicant expressly disclaims. It requires the construction of flumes at both ends of the dam, and is open to various other objections not necessary to enumerate.

Respectfully submitted.

PHILIP T. DODGE, *Attorney.*

Room No. 43.

DEPARTMENT OF THE INTERIOR,
UNITED STATES PATENT OFFICE,
WASHINGTON, D. C., *Dec.* 1, 1881.

"Locks and dams." Filed Nov. 11, 1881. Serial No. 45622.

John Du Bois, care P. T. Dodge, present:

In view of the fact that this application is carved out of a pending application showing the identical features and embrac-
389 ing a broad claim to the supply regulating features herein contained, this case should distinctly disclaim said feature that no misunderstanding may exist should the other case go to patent.

T. C. TIPTON,
Ass't Ex. in Charge.

John Du Bois. Locks and dams. No. 45622. November 9, 1881.
Application for patent.

Honorable Commissioner of Patents.

SIR: I hereby amend by inserting immediately in advance of the claims the following:

"I do not claim broadly herein the combination with a flexible dam or gate of an overflow by which the water can escape after reaching a fixed limit of elevation, the same constituting the subject-matter of a prior application."

Respectfully submitted.

JOHN DU BOIS,
By P. T. DODGE, *Attorney.*

December 8, 1881.

Issue division. 45622.

DEPARTMENT OF THE INTERIOR,
UNITED STATES PATENT OFFICE,
WASHINGTON, D. C., *Dec.* 12*th*, 1881.

John Du Bois, care P. T. Dodge, city.

Sir: Your application for a patent for an improvement in locks and dams, filed November 11th, 1881, has been examined and allowed.

The final fee, twenty dollars, having been received, the letters patent will be forwarded in due order of business.

390 Additional copies of specifications and drawings will be charged for at the following rates: Single copies, uncertified, 25 cents; twenty copies or more, 10 cents each. The money should accompany the order.

Very respectfully,

V. D. STOCKBRIDGE,
Acting Commissioner of Patents.

(Here follows diagram marked p. 391.)

liar construction, its forward portion, H, being attached to its rear portion, H′, by hinges *i*, and in such manner as to allow the rise and fall of the apron, the rear end of the portion H′ of the apron being securely attached to the hinge F′, as indicated in Figs. 1 and 4. To the under side of the part H of the apron, as shown in Figs. 1 and 3, a cleat, *l*, is secured, having bearings *l′* to engage with and slide in horizontal slots or "ways" *m*, cut in the sides *b b* of the main flume. It will thus be seen that the apron H H′ in its rise and fall will articulate upon the hinge F′, and that the length of the ways *m* will govern the height at which the apex *n* of the apron can rise within the main flume. In other words, the ways *m* are of such length as to allow the apron to be drawn down flat upon the floor of the main flume, or have its apex *n* thrown up to its greatest desirable height, as indicated in Fig. 1. We will suppose that it is desired to pass a raft from the pond A′ above the dam A to the water A^2 below, and that the head-gate D is in proper position in the main flume with its small flood-gate *d* closed, and that the small gate *d′* of the side flume, E, is closed also. We will further suppose that the water L, as shown in Fig. 1, beneath the apron H H′, has also been drawn off into the stream A^2 through the gate d^3, and consequently that the apron has fallen flatly, or nearly so, upon the bottom *c* of the main floor. Such being the condition of the chute, the operator will first proceed to elevate the gate *d′*, which act will permit the water from the side flume, E, to enter the main flume beneath the apron through the opening d^2, thus raising the apron from its flat position upon the floor *c* into the position, say, as shown in red line in Fig. 1. From such position it is evident that the apron may still be further elevated until it has attained its maximum height within the main flume. But the desired elevation of the apron, between its extremes of elevation and depression, will depend altogether upon the depth of water required above its apex *n* for the passage of the raft without striking or touching the apron at such point. Supposing such depth to be one foot, the operator will allow the water to flow into the main flume from the side flume, E, and beneath the apron, until the point *n* of the
394 apron is elevated to a point one foot below the head of water A′ above the dam. He will thereupon open the gate *d* until the water from the pond flows through the main flume and over the apex of the apron, after which the flood-gate D may be entirely removed, or elevated out of the way of the passage of the raft by any proper means. Under such condition of the chute it is evident that so long as the head of water in the pond above the dam remains the same, the depth of water will be one foot above the highest point of the apron; and, further, that as the water A′ draws down, the pressure above and beneath the apron will be such as to permit it to fall in exact ratio with the fall of the head of water A′, but meantime always maintaining the specified depth of water above the point *n* of the apron. Of course after the apron has fallen down to its extreme limit a continued decrease of head of water in the pond would in like manner decrease the depth of water above the apron.

I would here state that after the apron is once made to assume the position shown in Fig. 1, the flood-gate D may be dispensed with, in which case the part H of the apron will of itself act as a main gate to the main flume.

By constructing a chute as described, I am enabled to pass logs, lumber, rafts, boats, or other floating material from a point above the dam to a point below it without subjecting them to a perpendicular fall of water between the two points during their passage, at the same time maintaining a given depth of water above the apron, while the pond above the dam is being drawn down.

In the course of the operation of the chute, if there should be any hesitancy of the apron to become depressed as the head of water draws down above the dam, the depression of the apron may be accelerated, either by slightly depressing the gate d' or by slightly opening the gate d^3.

Having thus described my invention, what I claim as new, and desire to secure by letters patent of the United States, is—

1. In a dam-chute which is operated by hydrostatic pressure beneath an apron, a divided apron having its parts hinged at the point of junction, substantially as and for the purpose described.

2. In a dam-chute having a divided apron, a fixed articulating joint at one extremity of the apron, in combination with a sliding joint at the opposite extremity of the apron, for the purpose set forth.

3. A dam-chute having an apron made in sections H H′, hinged together at their junction, as at *i*, the lower section, H′, articulating upon a fixed hinge, and the upper end of the section H traveling in a horizontal slot at the bottom of the flume, the whole being operated substantially in the manner and for the purpose described.

Witness my hand and seal in the matter of my application for a patent for an improved chute for passing logs, rafts, boats, &c., through dams, this 29th day of July, A. D. 1862.

JOHN DU BOIS. [L. S.]

Witnesses:

GUSTAVUS DIETERICH.

EDWIN S. JACOB.

4 Sheets—Sheet 1.

J. DUBOIS.

Dam and Lock.

No. 229,682. Patented July 6, 1880.

No. 240 Dubois & Kirk & No. 259 Kirk & Dubois } p. 395

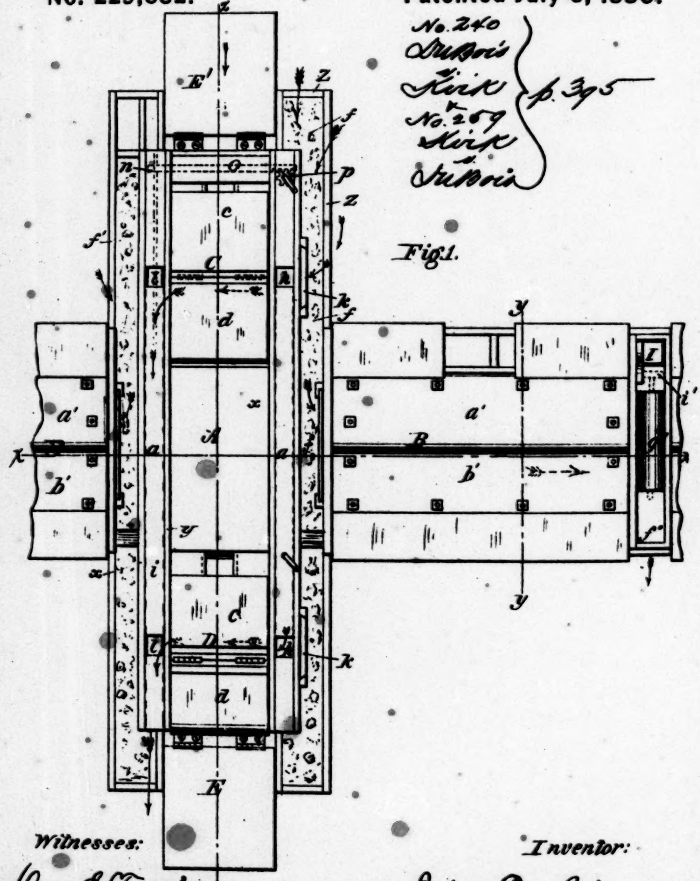


Fig. 1.

Witnesses:

Donn E. Twitchell

Will W. Dodge.

Inventor:

John Du Bois.

By his Attys.

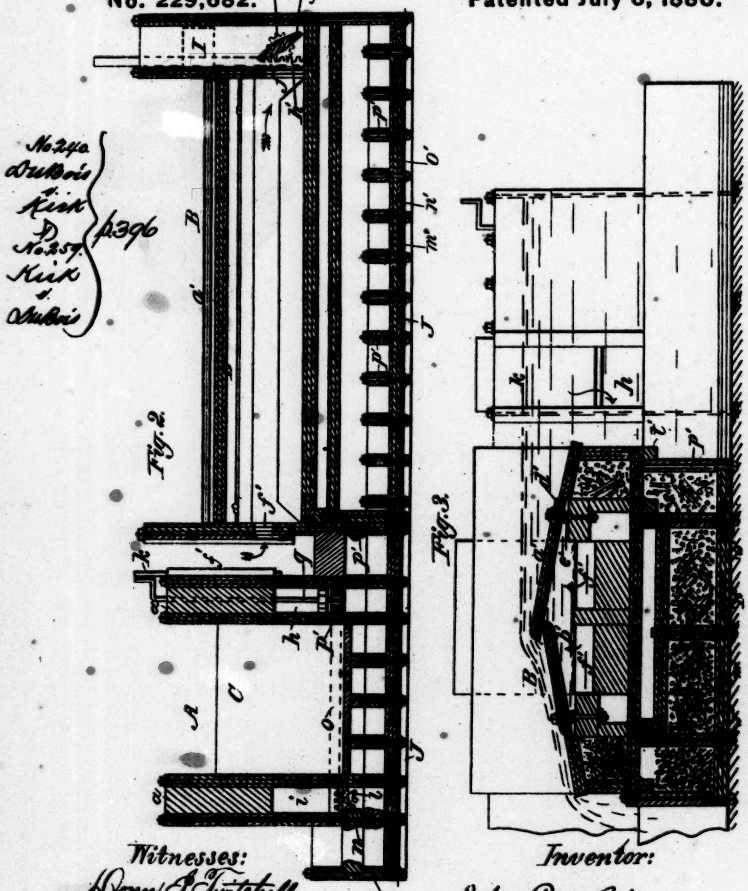
Dodge & Son.

4 Sheets—Sheet 2.

J. DUBOIS.

Dam and Lock.

No. 229,682. Patented July 6, 1880.



Witnesses:
Wm. S. Turtchell
Mill N. Dodge.

Inventor:
John. Du Bois
By his atty
Dodger Sr.

4 Sheets—Sheet 3.

J. DUBOIS.

Dam and Lock.

No. 229,682. Patented July 6, 1880.

No. 240 Du Bois v. Kirk & No. 259 Kirk v. Du Bois } p. 397

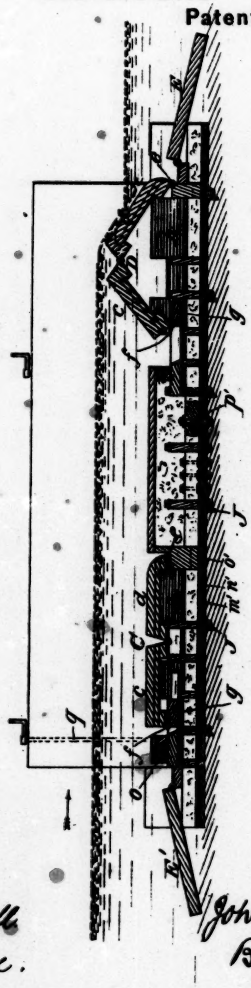


Fig. 4.

Witnesses:

Donn P. Twitchell

Will W. Dodge.

Inventor:

John. Du Bois

By his attys.

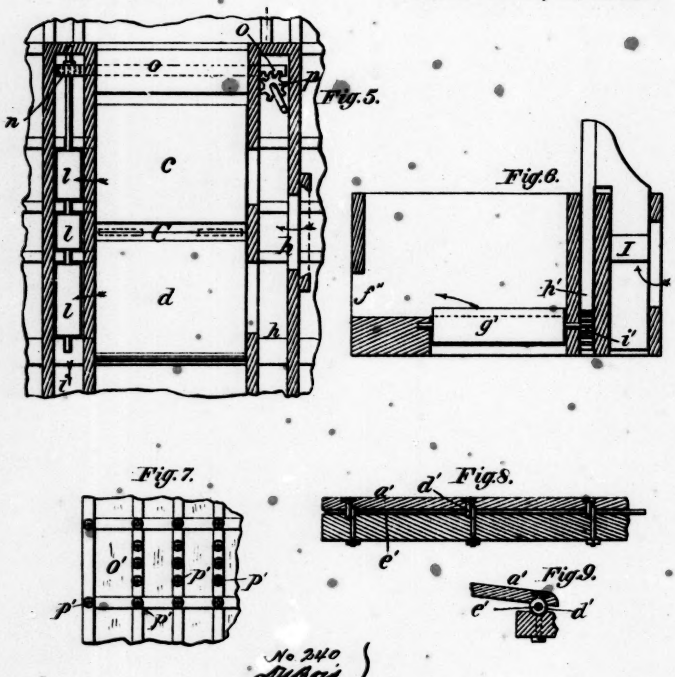
Dodge & Son

4 Sheets—Sheet 4.

J. DUBOIS.

Dam and Lock.

No. 229,682. Patented July 6, 1880.



No 240 DuBois v. Kirk and No 259 Kirk v. DuBois } p. 398

Witnesses:

Donn F. Twitchell.

Will W. Dodge.

Inventor:

John Du Bois

By his attys.

Dodge & Son

399 UNITED STATES PATENT OFFICE.

JOHN DU BOIS, of Williamsport, Pennsylvania.

Dam and Lock.

Specification forming part of Letters Patent No. 229,682, dated July 6, 1880. Application filed February 10, 1879.

To all whom it may concern:

Be it known that I, John Du Bois, of Williamsport, in the county of Lycoming and State of Pennsylvania, have invented certain improvements in dams and locks, of which the following is a specification.

My invention relates to a dam and lock designed more particularly for the purposes of slack-water navigation, to retain the water in large streams in order to render them navigable in the dry season, when, under the natural conditions, there would be a scarcity of water.

The objects of the invention are to cheapen and expedite the operation of building and placing the dam and lock, to prevent the danger of the water washing out the bottom beneath the dam, to avoid interference with navigation while building the dam and lock, to avoid the necessity of locking up or down to a height greater than the deficiency in the height of the water, and to render the dam automatically variable in height to correspond with the height of the river.

My dam and lock are built and completed, or nearly so, on shore, and after being floated to their places in the stream are sunk into position, and before or after being sunk they are filled at the base with gravel or stone to secure them in place and give them solidity.

The dam and lock are both constructed mainly of timber, in the peculiar manner hereinafter described, forming part of my invention, and on the under side are provided with transverse projecting angle-irons, which seat themselves in the bottom and serve the double purpose of holding the bodies in place and of preventing the passage of water thereunder.

The main gates of the lock and of the dam consist each of two wings or leaves jointed together and arranged to rise at the middle under the pressure of the water which is admitted beneath them for the purpose. The peculiar construction of the gates and dam in this respect and the application of an automatic float to govern the height of the dam according to the height of the stream are important features of the invention. Another feature consists in constructing the base and the body of the dam in separate parts, the first to be adapted to fit the bottom and placed in position prior to the dam proper, which is floated into position and sunk thereon.

(Here follow diagrams marked pp. 395, 396, 397, & 398.)

Figure 1 represents a top-plan view of my dam and lock, which are intended to be used jointly, and which are in many details identical in construction. Fig. 2 represents a vertical section on the line *x x* transversely across the lock and lengthwise through the dam; Fig. 3, a transverse section of the dam on the line *y y;* Fig. 4, a longitudinal section of the lock on the line *z z;* Fig. 5, a plan view of one end of the lock on an enlarged scale, with portions broken away in order to show the arrangement of flumes and gates; Fig. 6, a transverse section of the dam, showing the manner in which the float is arranged to operate the gate; Fig. 7, a plan view on an enlarged scale, showing the manner in which the bases of the lock and dam are constructed; Figs. 8 and 9, respectively, a longitudinal and a transverse section through the hinge of the dam.

In order that the nature of the invention may be more readily understood, I will first describe the general construction and mode of operation of both the dam and the lock, and afterward the details of construction or manner of building them, and also the manner of placing them in position.

A represents the lock, and B the dam, which latter extends entirely across the stream except at the point occupied by the lock. The lock consists, in the main, of two parallel side walls, *a*, built upon a base or foundation, and of two transverse rising and falling end gates, C and D. Each gate is divided across the middle into two leaves or flat sections, *c* and *d*, which are hinged together in such manner that their joined edges may be raised to any desired height or depressed until the gate assumes a flat position on the base or bottom, so that the entire body of water passes above it. The two positions of the gate are shown in Fig. 4, in which the gate C is shown depressed and the gate D elevated.

The lower or downstream end of each gate is attached by a hinge, *e*, to the base or bottom, and the upper end connected by a hinge, *f*, to a series of horizontally-sliding blocks, *g*, working either in grooves or upon guides in the base, the sliding connection being necessary in order to permit the elevation of the gate at the middle.

The elevation of the gates is effected by admitting and confining water beneath them, and the degree of elevation is controlled and limited by regulating the admission and discharge of the water, or by permitting the free admission of the water and regulating the rate of discharge.

The upper gate, C, may be made buoyant, so as to float in the water, or weighted so as to sink. In the former case the gate will readily rise while the lock is filled with water, upon the admission of water beneath it, and can only be depressed by permitting the water to escape from beneath it and applying a downward pressure through mechanical means. The latter arrangement will constitute the subject of a separate patent.

If the gate C be constructed to sink in water, it can be raised when the lock is filled by hydraulic pressure or lifting mechanism applied in a suitable manner. One simple manner of securing the elevation of the gate, supposing the level of the water above the

lock to be higher than the lower gate, is to close the upper gate, E′, and thus give to the water entering beneath gate C a head higher than the water-level in the lock. When this is done suitable means will be provided for actuating gate E′.

In order to secure the admission of the water beneath the two gates the lock is provided with a long flume, *h*, communicating with the stream above the lock and extending inward beneath both gates, as shown in dotted lines in Fig. 1 and Figs. 2 and 4. The escape of the water from beneath the gates takes place through a flume, *i*, which discharges at the lower end of the lock, and which opens beneath both gates on the opposite side from that on which the water is admitted, the inlet-flume *h* being on one side of the lock and the outlet-flume *i* on the other, so that the water passes transversely under the gates, as indicated by the arrows.

In order to control or shut off the admission of water beneath the gates, small cut-off gates *k* are arranged in the positions shown in the drawings. These gates may be constructed and operated in any suitable manner.

For the purpose of controlling the escape of the water from beneath the gates C D, which is ordinarily the means employed to control their elevation, small gates *l* are located in the discharge-flume at or near the ends of the main gate, as shown in Figs. 1, 2, and 5. When the gates *l* are opened the water will flow freely under the main gates and out through the discharge-flume, allowing the main gates to fall; but as the small gates *l* are closed the water confined under a head and pressure beneath the main gates will force them upward to a height corresponding to the extent to which the small gates are closed, not exceeding the height of the water above the lock.

The small flume-gates *k l* may be of any ordinary or suitable construction; but it is preferred to pivot them at or near the middle, as indicated in Fig. 5, in order to have the pressure balanced on the two sides, or substantially so, so that they may be operated easily.

Means for operating both the inlet and the outlet gates, which are located on opposite sides of the lock, will be arranged on one and the same side of the lock, in order that the attendant need not cross the same. Fig. 5 illustrates a simple arrangement for operating from one side of a lock a gate located on the other side, consisting of a pinion, *n*, attached to the journal of the gate and engaging with a rack-bar, *o*, which extends across the bottom of the lock and engages at the opposite end with a pinion, *p*, on the lower end of a vertical shaft, which has its upper end provided with a crank or hand wheel by which to turn it.

It will, of course, be understood that the flumes and flume-gates are so arranged as to admit of the main gates being operated alternately and independently of each other.

For the purpose of closing the end of the lock when for any purpose it is to be pumped out, and while it is being floated to its place in the stream, I hinge to the ends of the lock large gates E E′, which may be turned down upon the bed of the stream out of the

way, as shown in Figs. 1 and 4, or turned up against and across the ends of the lock. The upper gate, E, also serves to assist in controlling the action of gate C under certain conditions stated elsewhere herein.

Passing next to the dam, which is adjustable in height, it will be seen, on reference to Figs. 1 and 3, to consist of two longitudinal leaves, a' and b', arranged to rise and fall at their adjoining edges, which form the comb of the dam, in substantially the same manner as the main gates of the lock, and indeed the construction may be identical in the two cases. It is preferred, however, in the dam to hinge the outer ends or edges of both leaves or sections, and to have them overlap and slide upon each other at the middle, as represented in Fig. 3, the upper or upstream section extending over the other in order that the pressure of the water upon it may produce and maintain a close contact between them. This construction, which is somewhat cheaper than that represented in the lock, is also advantageous in that it is free from liability to be disabled by the accumulation of sediment, &c., at the upper end. The construction may also be adopted for the lock-gates, if desired.

When the edges of the sections slide upon each other, as shown, chains, rings sliding upon rods, or other devices may be employed to prevent them from separating. It is necessary that the hinges of the dam-sections, and also the hinges of the lock-gates, shall be very strong, and also that they shall produce a tight joint between the sections and the bases to which they are attached, and I therefore construct the hinges as represented in Figs. 3, 8, and 9
401 by providing the base and the sections each with a series of eyebolts, d', and passing a continuous rod, e', through said bolts, between the section and the base, and then tightening the bolts and drawing them into the wood until the rod bears both above and below. The rod thus arranged serves to unite the parts firmly, and also to produce a tight joint, which is not affected by the rise and fall of the sections.

For the purpose of securing the elevation and depression of the dam a flume, f', is arranged to conduct water beneath it from the higher elevation of the stream above, and a flume, f'', arranged to conduct the water from beneath the gate into the stream below.

A small gate or valve, g', located in the flume f'', serves to control the escape of the water from beneath the dam-sections, and thereby controls the height of the dam, in the same manner that the height of the lock-gate is controlled.

In order to control the valve or gate g' and the height of the dam automatically, I make use of a float, I, as shown in Figs. 1 and 6, mounted in the stream above the dam and provided with a rack-bar, h', moving upon a pinion, i', on the gate-shaft. The rise and fall of the water causes the float to rise and fall accordingly, and the float, in turn, opens and closes the gate, so as to render the escape of water from under the dam-sections proportionate to the height of water in the stream.

While it is preferred to connect and arrange the float and gate g' in the manner shown, it is obvious that any other connection and

arrangement may be adopted, provided the same results are attained, the essential feature of the invention in this regard consisting in the application of a float to control the passage of the water beneath the gate-sections. By properly adjusting the float the falling of the water will cause it to partially or wholly close the gate g', and thereby cause the dam to rise until the water reaches the desired height, and when the stream rises above the desired level the float opens the gate g' and causes the dam to fall until the level of the water is down to the desired point, thereby leaving the stream open to navigation, in the same manner as if no dam existed.

Having described the general construction and mode of action of the dam and lock, I will now describe the manner in which they are built up, the mode of construction being essentially alike in the two.

A site is first selected on the shore suitable for the building and launching of the dam and lock, and ways or slides provided upon which to build them. On the ways for the lock I place a series of transverse angle-irons, J, of an L-shape, as shown in Fig. 4, the irons being placed with one edge extending downward in such position as to extend crosswise of the lock when it is completed. Upon and across these angle-irons I place a close flooring of heavy plank, m', upon which I place a second flooring of transverse boards, n', which is, in turn, covered with a third flooring, o', extending transversely across the same, as shown in Figs. 2 and 4. The floors are all dressed to an exact thickness and nailed down firmly and closely. After the laying of the floor is completed I insert through the floor-boards and through the angle-irons a large number of vertical bolts, p', each having a nut and washer on the lower end, below the floor-irons, and a collar or flange above the floor and resting firmly thereon, as shown, so that the flooring is drawn firmly together and the angle-iron clamped against the floor between the collar and nut, so as to produce a water-tight joint. The bolts are extended upward above their collars a greater or less distance, each one having a height equal to that to which the superstructure is to be carried at that particular point. Upon the triple flooring thus nailed down I commence a crib-work, consisting of longitudinal and transverse timbers arranged at short distances apart and preferably let into each other, as shown in Fig. 2. Around the outside the crib-work or the outside timbers are carried up to a height of about six feet, or high enough to extend above the surface of the water when the floor is seated upon the bed or bottom of the river. This outside wall and the bottom are made tight, in order to exclude the water and admit of the entire lock being floated into the stream.

In applying the timbers they are bored with suitable holes and driven down upon the vertical bolts, and after they have all been applied nuts are screwed down upon the upper ends of the bolts, so as to force the timbers tightly together and render the whole structure strong and solid.

The side walls, a, are built upon and integral with the crib-work of timbers, and made solid except at the base, where they contain the flues, and are carried up to such height as to extend above the

water when the lock is sunk into position, and the bolts, which are located at suitable points, are extended up through the walls, and to a height equal to that of the walls when completed. This arrangement contemplates the idea of building the walls in the first instance to such height only as to extend above the water, and subsequently building them up of masonry to the required height, the masonry to be laid directly upon the wooden walls; but, if preferred, the walls may be built to their full height of timber in the first instance.

The bolts extending up through the walls are, like the others, provided on the upper ends with washers and nuts to secure the whole mass together. The cross-timbers or crib-work divide the base of the structure into a series of cells or compartments, and before placing the structure I fill as many of these cells with gravel or stone as can be done without sinking the structure.

The timbers which form the walls may be laid together in
402 any suitable manner which will give strength and rigidity, cross-pieces and cross-bolts being used, as required, to hold the pieces together.

At suitable periods in the course of construction the flumes are constructed, the gates applied, and the minor details provided, the entire structure being completed and ready for use, as regards all portions to be submerged, before it leaves the stocks or ways.

In the construction of the dam precisely the same steps are taken as in the construction of the base of the lock, the angle-irons, flooring, and crib-work being built up and bolted together, and finally the dam-sections hinged upon the top and the minor parts applied. The cells or compartments in the bottom, like those of the lock, are filled with gravel, and the angle-irons, like those of the lock, extend crosswise of the stream when the dam is in place.

When the two structures are completed I select a site in the deeper portion of the stream and prepare a foundation first for the lock by leveling the bottom, either by filling in or excavating, or both, as occasion may require. The lock is then launched and floated over the site and water admitted to cause it to sink to its place on the bottom. This being done, when the water in the stream is low there is little current to be contended with, and as the whole bed of the stream is left open at the sides there is no hinderance or impediment to navigation.

And setting the lock, the dam made complete, or in as many sections as circumstances may require, is launched and scuttled in the same manner.

As the structures settle to their places the angle-irons or mud-sills are forced down into the bed, and serve the double purpose of offering an immense resistance to any movement of the structures and of preventing the leakage of the water under them, as the water will not work downward under and upward behind the irons.

It is well known that the undermining of dams commences in and is due to the slow percolation of water through or under them, and that if this is prevented all danger is avoided; and hence the great value of the iron strips or sills arranged to seat themselves

in the bottom. It is manifest that the particular form, arrangement, and manner of securing the irons are matters of secondary importance, and that they may be modified provided they are arranged to extend downward and seat themselves in the bed of the stream.

When the bed of the stream is very rough or irregular operations may be facilitated by making the base of the dam separate from the top, adapting it to fit the bottom, and sinking it in place before applying the superstructure, to which the gates will be attached, as shown in Fig. 3. The superstructure will in such case be provided with transverse flanges or beams, *t'*, to engage with the base and hold it from shifting thereon, as represented.

I am aware that it has been proposed to construct the base or foundation of a lock and the footings of the side walls of timber, and float the same over the spot at which it is to be located, and subsequently build the walls thereon either by anchoring the foundation and permitting it to float during the operation, or by sustaining it temporarily in the water. My method of procedure differs therefrom in that I build the walls in the first instance, and before launching the structure, to a height greater than the depth of the water, so that the structure, after reaching its destination, may be sunk at once to its place, and that when so sunk its walls will stand above water, so that no masonry or other work need be done beneath the water.

My plan is advantageous in that it avoids the expense, trouble, and danger incident to the floating of the structure while its walls are being completed.

I am also aware that floats have been used to operate directly a waste-gate beneath which water escaped, and I am also aware that canal-locks built in place have been made of transversely-corrugated iron plates seated in a concrete bed, and this I do not claim.

I do not claim to be the first to construct a foundation-structure upon land and float the same to its place beneath the water, and then build a superstructure in the water thereon; nor do I claim to be the first to anchor and sustain a foundation such as above described in the stream above its final location, and then complete a superstructure thereon during or before the sinking of it to place. My method of construction permits the building operation to be completed on shore to such point that the structure can be floated to its place and sunk immediately, and that when sunk it will extend above the water. This method greatly cheapens the cost of construction, permits the parts to be adjusted accurately and united permanently and firmly, and enables the constructor to place the lock safely in position in rapid and turbulent streams, in which it could not otherwise be seated except at great cost.

Having thus described my invention, what I claim is—

1. The herein-described method of constructing river-locks without working below water, consisting in building upon land a floatable wooden structure embracing a bottom, main gates, flumes and flume-gates, side walls of a height greater than the depth of the water where the structure is to be located, and means, substantially such as described, for temporarily excluding the water, and then

launching the structure and floating it over the position selected for it, and finally sinking it directly to its place.

2. A floatable lock constructed of timber, as described and shown, with cells to receive stone or ballast and with elevated walls and end gates, whereby it is adapted to float to its place when completed to a height greater than the depth of the water in which it is to be used, and loaded with the ballast.

403 3. A floatable dam or lock provided with thin vertical angle-irons or mud-sills extending transversely across the under side, as shown and described.

4. A floatable dam or lock having at its bottom transverse depending sharp-edged irons or ribs adapted to cut their own way into and take a firm hold in the bed of the stream.

5. The combination of a jointed or flexible dam or lock-gate adapted to rise and fall beneath the water, a chamber or passage beneath the gate to admit water for elevating the same, a secondary gate connecting with said chamber and controlling the escape of water therefrom below the gate, and a float located above the dam and arranged to operate the second gate.

6. In combination with a jointed dam, B, and the water-passage thereunder, the pivoted gate g', having pinion i', and the float located above the dam and provided with the rack-bar acting upon the pinion.

7. In a hinged dam or water-gate, a water-tight hinge consisting of a series of eyebolts applied to the surfaces to be connected and a continuous rod, d, inserted through the eye bolts and seated against both of the surfaces, as described and shown, whereby the rod is caused to serve the double purpose of a hinge-pin and a packing.

8. The floatable lock provided with the internal gates, C D, and with the end gates, E, hinged thereto and arranged to turn down in the bed of the stream when not required for use.

9. The floatable lock consisting of the foundation and side walls, constructed of timber and provided with water-channels, the two flexible gates, and the two end gates.

10. In a lock, the combination of the lower lock-gate, the upper jointed gate, and the end gate, E, located above the upper lock-gate, as shown.

11. The combination of a base or foundation, such as described and shown, and a floatable dam or lock constructed for application thereto.

12. In a base or foundation for dams and locks, the combination of the flooring, the timbers thereon, and the bolts having collars between the floor and the timbers, as shown.

JOHN DU BOIS.

Witnesses:
WALTER S. DODGE.
P. T. DODGE.

408 UNITED STATES PATENT OFFICE.

JOHN DU BOIS, of Du Bois, Pennsylvania.

Lock and Dam.

Specification forming part of Letters Patent No. 236,488, dated January 11, 1881. Application filed September 24, 1880. (No model.)

To all whom it may concern:

Be it known that I, John Du Bois, of Du Bois, in the county of Clearfield and State of Pennsylvania, have invented certain improvements in locks and dams, of which the following is a specification.

This invention relates to that class of dams and gates which are made in sections and raised by admitting water beneath them from the pool of the dam and lowered by permitting said water to escape. The principle has long been known and used in flumes for creating and letting off artificial floods, passing logs, &c. A patent bearing date the 6th day of July, 1880, was granted to me for an improvement in building locks and dams on the same principle for use in large streams.

The present invention is designed to remedy certain defects in the plan described in the patent and to materially cheapen the cost of construction.

Instead of building the lock or dam upon ways built upon the shore, as in my previous system, I now raft a portion of the timber that is to be used for the crib-work of the lock or dam and place thereon, at suitable distances apart, cross-timbers, to serve as temporary supports for the angle-irons or mud-sills employed on the base of the permanent or final structure in the same manner as in the former patent. The angle-irons or sills, having the fastening-bolts applied to them in a vertical position, are then laid lengthwise upon the cross-bars, which serve to give them temporary support. A flooring of strong plank is then laid across the angle-irons or sills, a layer of well-seasoned boards laid upon and across the flooring-plank, and, finally, another course of plank laid upon and across the boards, thus producing a strong and tight bottom. The bolts, which are riveted or otherwise secured to the angle-irons, extend upward through and above the flooring to receive and hold the timbers forming the superstructure. As soon as the flooring is completed the first course of timber of the foundation or superstructure is laid thereon over and around the bolts and forced down tightly and firmly in place by the application of nuts to the bolts. The foundation thus formed is a structure capable of sustaining the weight of the crib-work forming the body of the main structure. I next proceed to withdraw the rafted timber from beneath the structure and then build the superstructure thereon in the same, or substantially the same, manner as described in the original patent,

after which the entire structure is loaded and set finally and permanently in position, this operation being also carried out in the manner stated in the previous patent. By the above method of construction I save a large amount of expense as compared with my original method, and also avoid the risks and dangers incident to the launching the immense structures from land.

Jointed gates adapted to be elevated by admitting water beneath them have been in use many years. The original gate of this class, known ordinarily as the "bear-trap" gate, consisted of two sections held by hinges at their outer ends and lapped and arranged to slide one upon the other at the inner ends, as the latter rose and fell. This gate could only be used in narrow chutes or flumes, and was only used for the purpose of raising artificial floods and passing logs, &c., when the water was let out of the pool. It possessed grave defects, as it had to be let entirely down before logs were allowed to pass over it, on account of the otherwise perpendicular fall from the top of the upper section to the surface of the lower one. In small streams and under high heads too much water was let off and the logs were thrown out upon the banks, while at the same time the pool was exhausted with but little benefit.

To remedy the above defects I devised a gate for which I received letters patent bearing date September 2, 1862, No. 36342, in which the two sections had their inner ends hinged together, while the outer or lower end of the lower section was hinged to the dam and the outer end of the upper section arranged to slide on the dam as the gate rose and fell. This answered the purpose for which it was designed by giving, under all adjustments, a gradual descent from its top or highest point downward. On testing the gate practically I find that it will not answer as a dam for large streams, for the reason that the accumulation of mud, gravel, and other obstructions would in some cases prevent the movement of the
409 sliding end and in other cases subject the gate in closing to severe and dangerous strains, causing wear and injury and necessitating frequent repairs. Other difficulties of minor importance not necessary to be enumerated were also encountered.

In order to overcome all the troubles above enumerated, I now construct the gate in three sections. The two main sections are hinged to the foundation or dam at their outer ends, and the lower end of the upper section lapped over and arranged to slide upon the upper end of the lower or down-stream section in substantially the same manner as in the bear-trap gate. To the lower end of the upper section I hinge the third section, allowing its lower free end to overlap the lower section. This third section forms an apron and produces under all adjustments an unbroken gradual descent from the top of the upper section to or over the lower section. The third section or apron is ordinarily made of such length as to entirely cover the lower section when the gate is at its greatest elevation, and in such case the lower end of the apron is permitted to slide upon the foundation, and is connected thereto by sliding joints or guides, which serve to limit the movement of the apron and prevent the gate from being raised too high. When

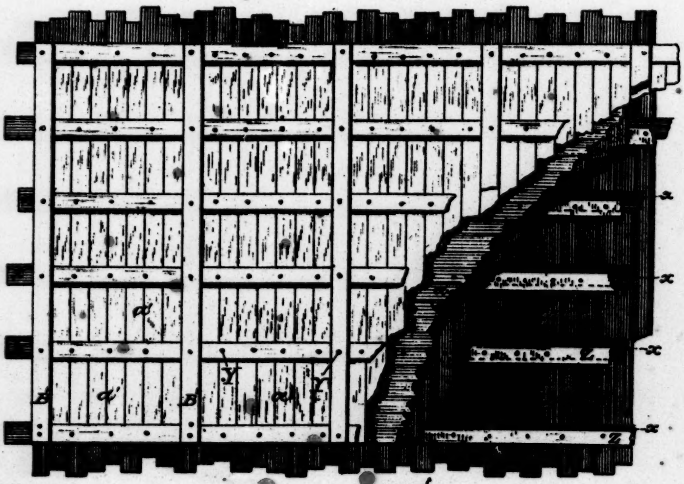
(No Model.) 4 Sheets—Sheet 1.

J. Du BOIS.

Lock and Dam.

No. 236,488. Patented Jan. 11, 1881.

Fig. 2.



No 240. DuBois & Kirk
No. 257. Kirk & DuBois
p. 404

Fig. 3.

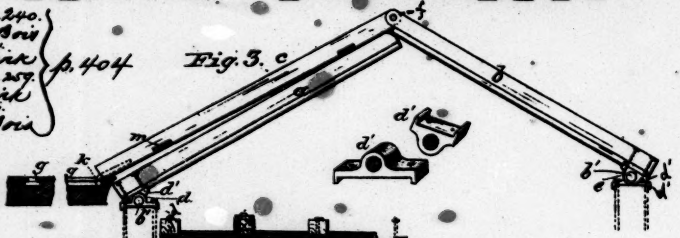
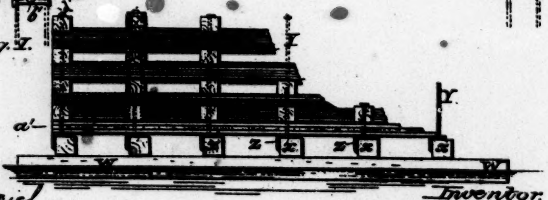


Fig. 1.



Witnesses.
Fred. C. Dieterich
William W. Dodge.

Inventor.
John Du Bois,
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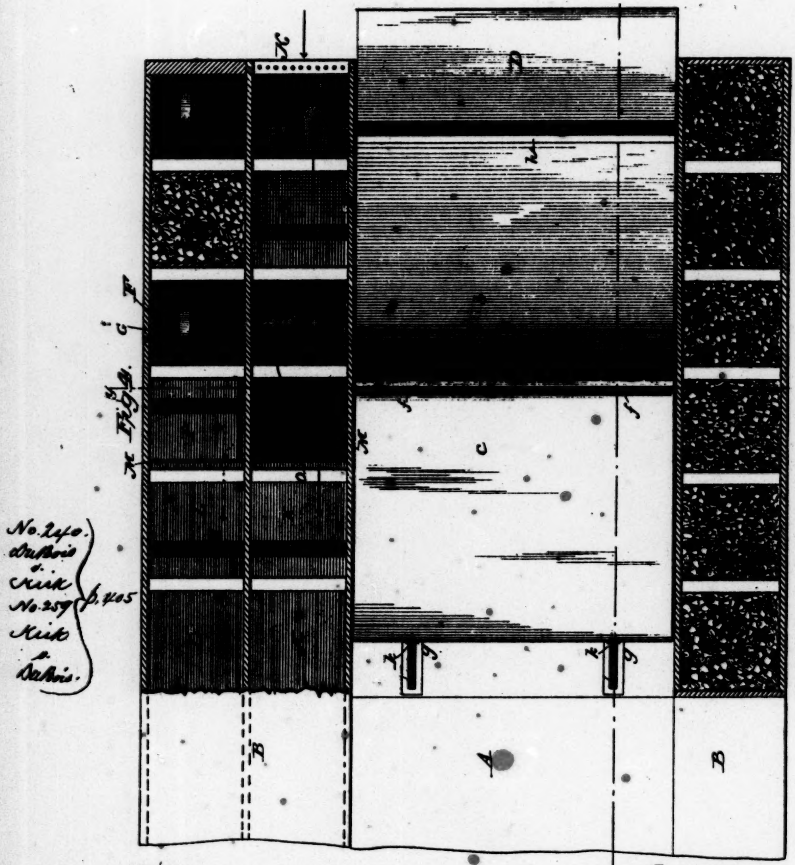
Attys.

(No Model.) 4 Sheets—Sheet 2.

J. Du BOIS.

Lock and Dam.

No. 236,488. Patented Jan. 11, 1881.



Witnesses

Sidney P. Hollingsworth

William W. Dodge.

Inventor.

John Du Bois

By Dodge Bro

Attys.

(No Model.) 4 Sheets—Sheet 3.

J. Du BOIS.

Look and Dam.

No. 236,488. Patented Jan. 11, 1881.

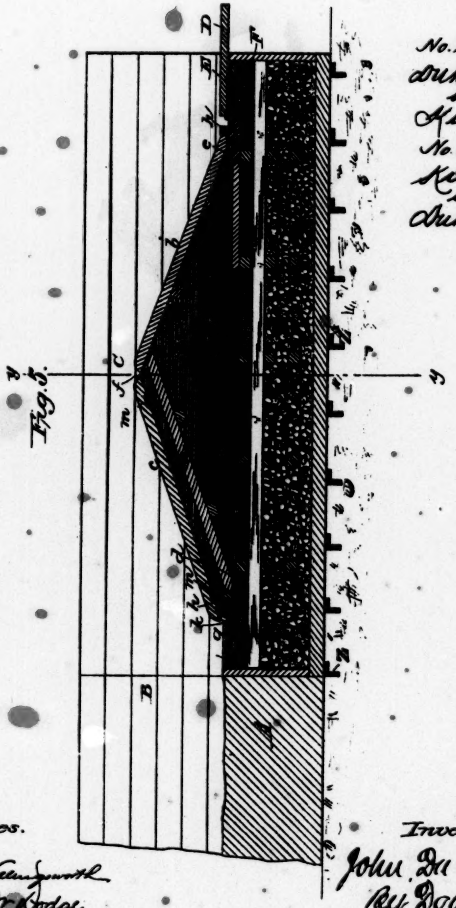


Fig. 5.

No. 240 DuBois & Kirk
No. 257 Kirk & DuBois
} p. 406

Witnesses.

Henry P. Hollingsworth

William M. Dodge.

Inventor.

John Du Bois.

by Dodgerson Attys.

(No Model.) 4 Sheets—Sheet 4.

J. Du BOIS.

Lock and Dam.

No. 236,488. Patented Jan. 11, 1881.

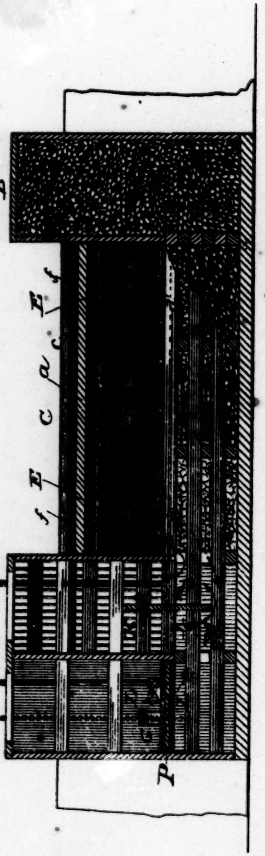


Fig. 6.

No. 240. DuBois v. Kirk
No. 259 Kirk v. DuBois
p. 407

Witnesses:
Sidney P. Hollingsworth
William W. Dodge.

Inventor
John Du Bois.
By Dodge & Dodge
Attys.

the gate is at its highest elevation the apron should rest firmly on top of the lower section, so as to give the dam increased strength at the time of the greatest strain. The apron, in addition to affording the gradual descent and giving the increased strength, also serves to protect the hinge of the lower section, and avoids all the former troubles from the accumulation of mud, &c.

It is preferred to employ as the sliding connection of the apron T-headed bolts, or their equivalents, arranged to slide in slotted plates secured to the foundation; but any other suitable connection may be employed.

While it is preferred to have the apron completely cover the lower hinged section of the gate, good results may be secured when the apron covers only the upper part of said section. In the latter case the apron will have its lower end united by sliding connections to the said section instead of the foundation.

In place of the eyebolts used in my previous dam to secure the hinge-rod, I now employ metal blocks secured by bolts, which are preferably fastened to the angle-irons on the bottom, the better to unite the gates to the foundation, as hereinafter described in detail.

In constructing a lock with its two gates I now use, instead of the two flumes on opposite sides, one to admit the water to and the other to discharge it from the gates, as in my patent of July 6, 1880, a double flume located on one side. The section which admits water under the gates is open at its upper end and closed at its lower end, while the one that discharges the water from beneath the gates is open at the lower and closed at the upper end. A connecting chamber or passage is made under and across the entire flume opposite each gate, and small gates or wickets arranged to control and direct the course of the water, as required.

In the practical use of the lock it is necessary that the gate shall be depressed beneath the level of the standing water, in order that boats, &c., may pass over them. This depression of the gates may be secured by making them buoyant and providing means to force them down, or by adapting them to sink in the water and providing means for forcing them up. In my present improved structure I make use of the first-named plan, using chains and winding-drums, or equivalent mechanism, actuated by means of a water-wheel, or manually, or otherwise, to compel the descent of the gate beneath the water. Supplemental gates applied to the ends of the lock to exclude the water during repairs may be depressed in the same manner.

The accompanying drawings fully illustrate my improved structure and the method in which it is constructed.

(Here follow diagrams marked pp. 404, 405, 406, & 407.)

Figure 1 is a side elevation, showing the manner in which the structure is commenced upon the rafted timber. Fig. 2 is a top-plan view of the same. Fig. 3 is an enlarged view, showing the construction of the improved gate. Fig. 4 is a top-plan view, showing one end of a lock with the improved gate and flumes therein.

Fig. 5 is a longitudinal vertical section of the same on the line *x x*, Fig. 4; Fig. 6, a transverse vertical section on the line *y y*, Fig. 4.

Referring to Figs. 1 and 2, W represents the rafted floating timbers upon which the structure is commenced and temporarily sustained. X represents the cross-bars or timbers laid upon the timbers W, and supporting the angle-irons or mud-sills Z, which are placed thereon with one edge extending downward at the side of the bars, as shown. B′ represents the timbers forming the base of the permanent structure laid upon the flooring *a′*, which in turn rests upon the angle-irons. Y represents the vertical bolts secured to the angle-irons and extending upward through the structure to tie the same together. The timbers W and X are removed after the first course of crib-timbers are in place.

Referring to Figs. 3, 4, 5, and 6, A represents the formation or base of the lock; B, the side walls, and C the gate. The gate is clearly shown in Figs. 3, 4, and 5, in which *a* represents the lower section, hinged at its lower end, as shown at *d*, Figs. 3 and 5; *b*, the upper end, hinged at its lower end at *e′*, Figs. 3 and 5, and at its upper end overlapping the lower section, and *c* the third section or apron, having its upper end hinged to the free end of section *b*, as shown at *f*, Figs. 3, 4, 5, and its lower end hinged or connected to the
410 base by the sliding joint *g k*. The sliding connection consists of slotted plate *g*, secured to the base, and the T-ended irons *k*, secured to the end of the apron and working in the plates, as shown, so as to keep the apron down in place and also limit its end motion. The apron or section *c* entirely covers the section *a*, as shown, and when the gate is at its greatest elevation the two rest firmly against each other. The hinges which connect the sections *a b* to the base are clearly shown in Fig. 3. Bearing-plates *d′*, such as shown, each with a hole through it, are bolted through their ends firmly to the base and the gate. Pivot-rods *b′* are passed through and unite the plates *d′*, and, bearing against the faces of the base and gate, form a water-tight packing between them.

In order to stiffen and strengthen the apron, metal bars *m* may be seated in its surface, as represented in Figs. 3 and 5.

The means for depressing the gate beneath the water consists, as shown in Figs. 5 and 6, of chains E, secured to the under side of the gate and winding upon a horizontal shaft, F, mounted in bearings in the base. The shaft is provided, as shown in Figs 4 and 6, with an operating-wheel, G, at one end. This may be a water-wheel to be operated by the passing water, or gear-band or chain-wheel to connect with manual device, a steam-engine, or other motor. The sliding-section *c* of the main gate and the chain used to depress the gate each serve as a connection to prevent the other sections from being carried so high as to separate at the top. Either of said devices will alone answer the purposes named under ordinary circumstances; but the two combined of course give additional security. The repair-gate D, located at the end of the lock to exclude water therefrom when required, is hinged to the base and connected with chains and a winding-rod in the same manner as the other gate.

Passing now to the flumes which conduct the water to and from the gates, K, Figs. 4 and 6, represent the inlet flume, having an open upper end communicating with the pool above the gate and extending thence lengthwise in the lock past both of its gates and closed at the lower end. L represents the outlet-flume, commencing at the side of the upper lock-gate, C, with a closed end, and extending thence to the lower end of the lock, with an open lower end. A cross channel or passage, M, below the flumes communicates with the space under or within the gate G, and also communicates by gates O and P with the inlet-flume K and outlet-flume L, as clearly represented in Figs. 4 and 6. The flume-gates O and P, commonly known in the art as "wickets," are pivoted in the middle and provided each with a crank-arm, *m*, and rod *n*, by which they may be opened and closed by an attendant standing on top of the lock. When the wicket O is open and wicket P closed the water will enter the flume K from the pool and pass by the gate O into the transverse passage M, and thence into the space beneath the gate C, causing the same to rise. When wicket O is closed and wicket P opened the water will pass from beneath the gate through the transverse passage M, beneath the wicket O, and thence upward past wicket P into the discharge-flume L, by which it is conducted into the stream below the lock, thereby permitting the gate to descend. If the gate is buoyant, as described, the depressing mechanism is brought into action to submerge the gate beneath the standing level of the water in the lock.

Having thus described my invention, what I claim is—

1. The herein-described method of building and placing locks and dams, consisting in the following steps, viz: constructing a raft of timber, building upon said raft while it is floating a base or foundation structure adapted to float, removing the raft from beneath the base, building the superstructure upon the floating base, and finally sinking the completed structure as a whole to its place.

2. The method of constructing dams and locks, consisting in first providing a temporary float in the water, next building upon said float a base or foundation for the dam or lock adapted to float, next removing the temporary float, and finally building permanently upon the floating base the main or super structure.

3. The process of constructing the herein-described gate or dam, consisting in first forming a raft of timber with cross-bars thereon, placing the angle-irons and bolts upon the said bars, placing the flooring and timbers above the angle-irons, fastening the angle-bars and parts above them together, and then withdrawing the raft-timbers and cross-bars.

4. The flexible gate or dam, consisting of two sections hinged at their distant and lapped loosely at their adjacent ends, and a third section hinged to one of the main sections and overlying the other.

5. In combination with two hinged co-operating sections of a flexible gate or dam, a third section or apron, hinged to the upper main section and overlying the lower main section, substantially as shown and described.

6. A flexible water-gate or dam, adapted to rise and fall, consist-

ing of a single leaf or section on the upstream side and two lapped sections or leaves on the downstream side.

7. In a water-gate or dam, the combination of two leaves or sections hinged at their distant and lapped at their adjacent ends, and a third section having one end hinged to one of the main sections and its opposite end secured by a sliding joint or connection, substantially as described and shown.

8. The combination of the sections *a b*, hinged at their ends and lapped one upon the other, and the lower *c*, hinged to section *a* and connected to the base or foundation by a sliding joint.

9. In a flexible rising-and-falling gate, two gate sections
411 or leaves hinged at their outer and lapped at their inner ends, and a connection, substantially as shown, to prevent the sections from rising so far as to separate.

10. In combination with the apron *c*, as described, the T-shaped heads and slotted plates connecting the apron with the base of the lock.

11. In combination with the flexible buoyant gate or dam, positively-acting means, substantially as described, to depress the same beneath the water-level.

12. The combination of the flexible buoyant gate, means for depressing the same beneath the water, and a water-wheel for operating said mechanism arranged to be operated by the passing water.

13. The combination of the gate or dam, the flumes K L, passage M, and gates or wickets O P.

JOHN DU BOIS.

Witnesses:
GEO. R. VOSBURG.
T. G. GORMLY.

(No Model.) 2 Sheets—Sheet 1

J. DU BOIS.

LOCK AND DAM.

No. 251,771. Patented Jan. 3, 1882.

Fig. 1.

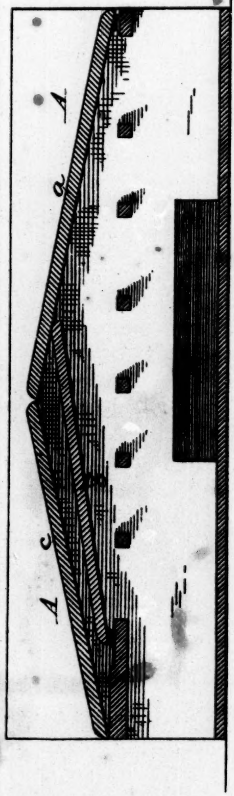
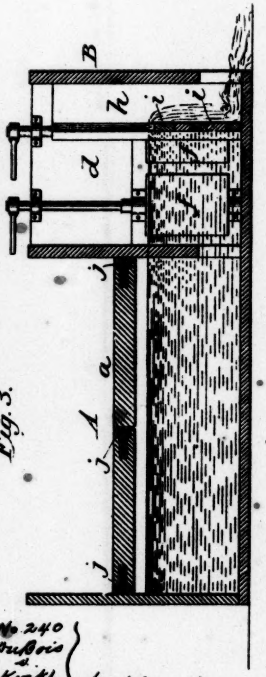


Fig. 3.



No. 240 Du Bois & Kirk. No 259. Kirk & Du Bois. } p. 412

WITNESSES

Sidney P. Hollingsworth

Robt. L. Miller

INVENTOR

John Du Bois

By his Attorney

Philip T. Dodge

(No Model.) 2 Sheets--Sheet 2.

J. DU BOIS.

LOCK AND DAM.

No. 251,771. Patented Jan. 3, 1882.

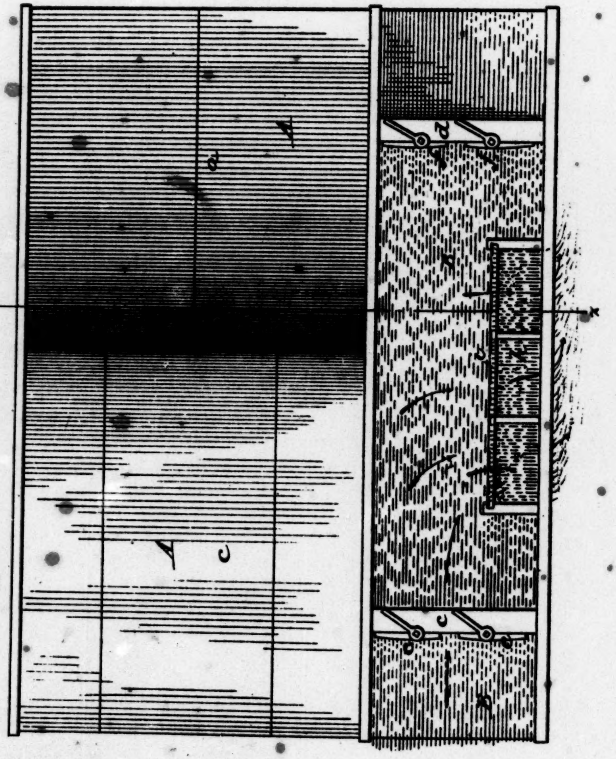


Fig. 2.

No. 244 Du Bois v. Kirk. No. 259 Kirk v. Du Bois } p 413

WITNESSES

Sidney P. Hollingsworth

Robt S. Miller

INVENTOR

John Du Bois.

By his Attorney. Philip T. Dodge

414 UNITED STATES PATENT OFFICE.

JOHN DU BOIS, of Du Bois, Pennsylvania.

Lock and Dam.

Specification forming part of Letters Patent No. 251,771, dated January 3, 1882. Application filed November 11, 1881. (No model.)

To all whom it may concern:

Be it known that I, John Du Bois, of Du Bois, in the county of Clearfield and State of Pennsylvania, have invented certain improvements in locks and dams, of which the following is a specification.

My present invention relates to improvements designed more particularly for use in connection with that system of dams and locks represented in letters patent, heretofore granted to me, Nos. 229,682 and 236,488.

The objects of the present invention are, first, to prevent the flexible gates or dam-sections from being subjected to an excessive or dangerous pressure of water from beneath; and, second, to permit the dam to adjust itself to slight variations or irregularities in the foundation, and to prevent the leakage of water past and between the various sections of which the lock or dam may be composed.

The first part of my invention (for limiting water-pressure beneath the gate or dam) consists in the use of an overflow or discharge opening arranged in the flume or supply-chamber in advance of the gate or dam, and at such height as to permit the escape of the water past the gate, without entering beneath the same, whenever the desired limit of pressure is reached. My invention in this regard is restricted to an arrangement wherein the head of the water is regulated before it passes beneath the gate or dam, as contradistinguished from a system wherein the water is first passed beneath the dam or gate and then permitted to escape through a safety-outlet. By limiting the head of the water previous to its passage beneath the gates I am enabled to secure better results and to make use of a much more simple construction than is required when the water is first passed beneath the gate and then permitted to seek a safety-outlet.

The second part of the invention consists in a flexible dam consisting of hinged overlapping leaves, each leaf composed of a series of sections arranged side by side, said sections being provided, when required, with packing in the adjacent edges.

Referring to the drawings—

(Here follow diagrams marked pp. 412 & 413.)

Figure 1 is a longitudinal vertical section through a gate constructed on my plan. Fig. 2 is a top plan view of the same. Fig. 3 is a cross-section on the line *x x*, Fig. 2.

A represents my dam or gate, consisting of leaves or sections *a*, *b*, and *c*, connected and arranged, as in my previous patent, so that they may be raised and lowered at their inner end, the elevation being effected by the admission of water into the space or chamber beneath the gate, in order to force the same upward. Under the construction represented in my previous patents a possibility existed of the gates being subjected to an excessive and dangerous pressure in the event of the water above the dam attaining an excessively high head or elevation. In order to avoid this danger, I now provide the flume B, through which the water is introduced to and discharged from the space beneath the gate, with transverse bulk-heads *c d*, containing gates or wickets *e f*, serving respectively to control the admission or passage of the water to and from the gate. Water being admitted beneath the gate elevates the same, and at the same time rises within the flume or supply-chamber, above the lower bulk-head, *d*, the gates *f* being closed to maintain a limited head of water beneath the gate. In the supply-chamber B, in advance of or above the bulk-head *d*, I form a lateral discharge or overflow chamber, *h*, through the top of which the water may escape from the flume or supply-chamber whenever the fixed limit of elevation is attained.

The inner side of the discharge or overflow chamber *h*, from which the water flows to escape, is composed of a series of planks, *i*, seated one upon another in grooves in the frame. By adding planks to or removing them from the series the height of the overflow-wall may be increased or diminished to any extent desired, and in this way the elevation of the water, and the consequent elevation of the dam, may be fixed at any point, it being manifest that as soon as the water reaches an elevation at which it can escape from the chamber *h* the elevation of the dam will cease. Thus it will be seen the head of the water is regulated previous to its reaching the gate, preventing the possibility of the latter receiving an excessive strain.

It will be observed that under my system of construction the surplus water, instead of passing beneath the gate to be discharged, escapes directly through the flume, past the gate, without entering thereunder.

415 I am aware that an attempt has been made to protect gates of the class herein described from excessive pressure by providing at a suitable elevation an outlet or waste opening, through which the surplus water can escape from beneath the gate after it has reached the desired limit of elevation, and this plan I do not claim. I find in practice that a more simple construction is permitted and a more reliable action is secured by providing an outlet through which the surplus water may escape before reaching the gate.

Instead of using the removable planks as a means of regulating

the height of the water, a vertically-sliding gate, or any equivalent arrangement, may be employed to regulate the height of the water.

Passing now to the construction of the dam, it will be seen that each leaf, instead of being made in one continuous length, as in my previous patents, is composed of a number of sections arranged side by side. The sections of each leaf are arranged to overlap the joints, or break joints with the sections of the other leaf or leaves, as represented in Fig. 2 of the drawings. It will be readily seen that by arranging the sections of each leaf to overlap the joints between the leaves of the contiguous sections the dam, when of great length, is given a limited amount of flexibility, while at the same time the sections of the leaves are caused to remain substantially in line with each other, and the individual sections prevented from rising or falling out of their proper position.

In order to prevent leakage between the sections of the leaves, their adjacent edges are provided with packing-strips of any suitable character. The packing represented in the drawings consists of a wooden strip or bar, *j*, inserted into the edge of one section and forced outward by means of a spiral spring against the edge of the adjoining sections, as clearly represented in Figs. 2 and 3. In place of the spiral spring flat springs may be used, or water may be admitted through openings in the interior of the dam to the space behind the packing-strips for the purpose of forcing them outward, and in place of the wood strips of rubber, or of wood faced with rubber, may be substituted.

I do not claim, broadly, herein the combination, with a flexible dam or gate, of an overflow by which the water can escape after reaching a fixed limit of elevation, the same constituting the subject-matter of a prior application.

Having thus described my invention, what I claim is—

1. In combination with a flexible dam or gate having means for conducting and maintaining water thereunder, an overflow or discharge to limit the head of the water located at a point in advance of the gate, whereby the surplus water is permitted to escape before reaching the gate.

2. The combination of a jointed or flexible gate elevated by the admission of water thereunder and a vertically-adjustable outlet to limit the head of the water acting beneath the gate or dam, whereby the gate may be caused to stop automatically at any desired height.

3. In combination with the flexible dam, the flume B and wickets *f*, a discharge or overflow chamber, *h*, arranged in connection with the flume, substantially as shown.

4. In combination with the dam A, flume B, and means for retaining a head of water in the flume and beneath the dam, the overflow-chamber *h*, provided with removable boards *i*.

5. The flexible dam or gate consisting of hinged overlapping

leaves, each leaf composed of a series of sections arranged side by side and provided with packing seated in grooves in their adjacent edges, substantially as shown.

6. A flexible dam or gate consisting of co-operating leaves, each leaf composed of a series of sections, the sections of one leaf arranged to overlap or break joint with the sections of the other leaf, substantially as described.

JOHN DU BOIS.

Witnesses:

JOSEPH PERRY TAYLOR.
GEORGE RICHARD VOSBURG.

419 UNITED STATES PATENT OFFICE.

ARTHUR KIRK, of Sharpsburg, Pennsylvania.

Movable Dam.

Specification forming part of Letters Patent No. 268,411, dated December 5, 1882. Application filed May 31, 1881. (No model.)

To all whom it may concern:

Be it known that I, Arthur Kirk, of Sharpsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful improvement in movable dams; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to improvements in the construction of movable dams and locks, whereby they are stronger, safer, more durable, and more easily operated than those heretofore in use. By my improvements defects heretofore existing in the old bear-trap plan are overcome.

My invention consists, first, in constructing the foundation with several floors having intervening spaces which are divided into compartments by partitions of any desired height formed by boards laid alternately at an angle to each other, so arranged as to cross at intervals, and then fitting the spaces between the boards with cement and the compartments with sand, gravel, stone, or other suitable material; second, in extending the ends of the top floor several feet beyond the foundation to protect the latter from percolation or wash of the water, which undercuts the foundation; third, of an improved dam-gate consisting of a double journal or pintle bolted to one part, with each journal working in one end of a double-ended sleeve on the other part, the said parts being respectively bolted to the gate or foundation, and each pintle works in the adjoining ends of two sleeves, so that as long a hinge as is desired is made by simply adding duplicates of the parts named; fourth, of a rising gate or gates provided with a telescoping joint, which, permitting a limited movement, will enable the gates to accommodate themselves to any unequal settling of the foundation; fifth, of an open sluice, waterway, or tail-race so arranged relatively to the dam that the water which is not required to support the leaves will escape, and so relieve the dam of all unnecessary pressure; sixth, in supports or props hinged to the foundation, under the gates, for use in supporting the gates in case of repairs; seventh, in operating the wickets by levers connected to pistons actuated by hydraulic, air, or steam pressure supplied from and controlled at a common point; eighth, in a moving signal connected to the rising gate, and so arranged as to indicate the elevation of the dam; ninth, in use of wooden screws in those parts exposed to water; and, finally, in details of construction hereinafter set forth.

To enable others skilled in the art to make and use my invention,

I will now describe the same by reference to the accompanying drawings, (three sheets,) in which—

(Here follow diagrams marked pp. 416, 417, & 418.)

Figure 1 is a vertical cross-section of the dam and foundation, the gates being down. Fig. 2 is a like view of the gates when up. Fig. 3 is a detail view, illustrating the construction of the foundation. Fig. 4 is a view of one form of the relieving tail-race. Fig. 5 is a section of a portion of one of the gates, showing the telescoping joint and the water-tight joint between the end of the dam and the abutment. Fig. 6 shows the use of the wooden screws in the construction of the gates. Figs. 7 and 8 are sectional views of the gate-hinge. Fig. 9 illustrates the manner of operating the wickets from one point by steam, air, gaseous, or water pressure. Fig. 10 is a view of the signaling apparatus.

Like letters of reference indicate like parts in each.

The foundation 1, the gates 2 and 3, and lower wall, 4, are made of boards or planks of wood (or sheets of iron) in longitudinal and transverse courses 5 and 6, of irregular length and width, so that the boards of each longitudinal or transverse course shall break joint with those of other longitudinal or transverse courses. This construction does away with the necessity of preparing the timber to any particular size or shape, and makes a stronger and more compact structure than can be obtained in the use of solid cut timber.

The foundation 1 is constructed of several distinct floors, 7, 8, and 9. The first floor, 7, rests on the transverse timbers 10, and is composed of three or more longitudinal and transverse courses of boards, 5 and 6. Above the floor 7 are a number of compartments, 11, of any desired size, formed by partitions 12, made of boards or planks 13 14, Fig. 3, crossing each other at intervals and piled to any desired height to form pens. The spaces 15 left between the parallel boards by the lateral ones are filled or closed with cement to make them water-tight, and then the compartments 11 are
420 filled with stones, gravel, sand, or other heavy material.

The second floor, 8, is similar in construction to floor 7, and covers the compartments 11. Above it other compartments, 16, similar to compartments 11, are formed by building the partitions 12 up to the desired height. The spaces 15 are then closed with cement and the compartments filled with stone or other suitable material, the same as compartments 11. The third or top floor, 9, is made in the same way as the floors 7 and 8, but preferably thicker, and with the ends extended beyond the substructure, up and down stream, as at 61, to prevent the foundation being damaged by the percolation or reaction of the water into and through it, which might occur if the wash or waves struck immediately against the substructure.

The gates 2 and 3 are constructed, as described, of longitudinal and transverse courses of boards or planks 5 and 6, which break joint with each other. These gates are of any desirable length, being made long enough to extend across the stream. This is possible by reason of the boards or planks of which they are formed over-

(No Model.)

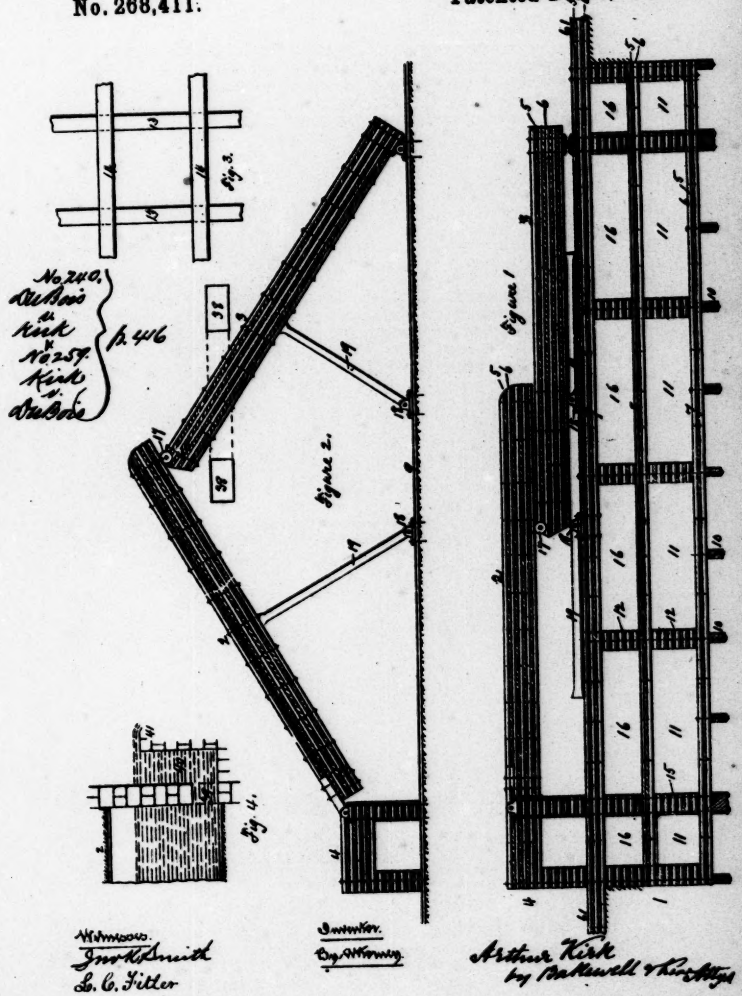
3 Sheets—Sheet 1.

A. KIRK.

MOVABLE DAM.

No. 268,411.

Patented Dec. 5, 1882.



Witnesses.
Jno. K. Smith
L. C. Fitler

Inventor.
By Attorney.

Arthur Kirk
by Bakewell & Kin Attys

(No Model.) 3 Sheets—Sheet 2.

A. KIRK.

MOVABLE DAM.

No. 268,411. Patented Dec. 5, 1882.

Figure 5.

Figure 6.

No 240. DuBois v. Kirk & No. 259. Kirk v. DuBois } p. 417

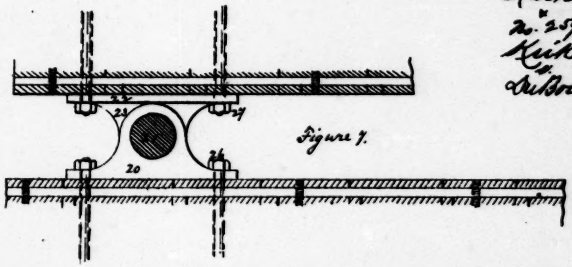


Figure 7.

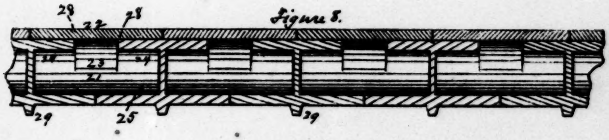


Figure 8.

Witnesses.
Jno. K. Smith
L. C. Fitler.

Inventor. Arthur Kirk
By Attorneys Bakewell & Kerr

(No Model.) 3 Sheets—Sheet 3.

A. KIRK.

MOVABLE DAM.

No. 268,411. Patented Dec. 5, 1882.

No 240
DuBois
v.
Kirk
v.
No. 259
Kirk
v.
DuBois
p. 418

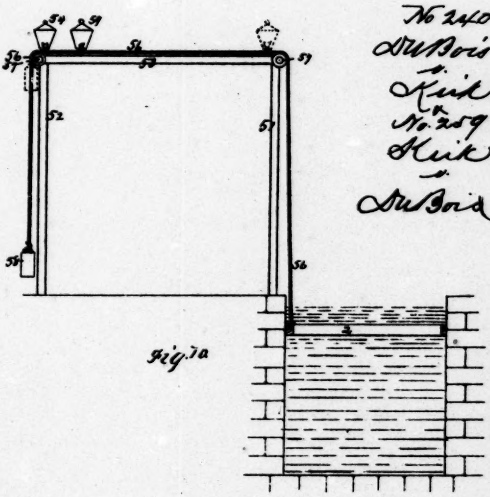


Fig. 10

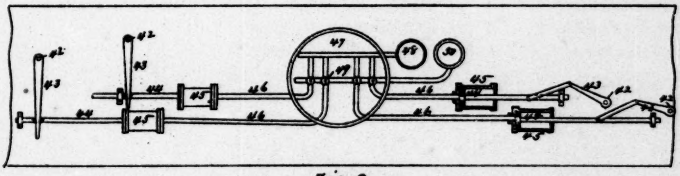


Fig. 9.

Witnesses.
Jno W Smith
L. C. Fitler.

Inventor
Arthur Kirk
by Bakewell & Lee
Attorneys

lapping each other, so that, in fact, there need be no limit to the length of the dam. The gates are hinged so that the upper one, 2, overlaps the end of the lower one, 3, whether open or closed. In order to relieve the friction of the lower gate on the upper one in opening and closing, I provide the lower one, 3, with a friction roller or rollers, 17, at its outer upper edge. The gate 3 is hinged to the foundation 1, and when closed lies flat near the floor 9. The gate 2 is hinged to a wall, 4, at such a height that when closed it shall be horizontal, or nearly so, and rest upon the gate 3. Under the gates, and hinged to the foundation at 18, are pivoted supports 19, used for sustaining the gates in an open position to facilitate repairs, as shown in Fig. 2. When not in use the supports 19 are laid flat on the floor 9, as shown in Fig. 1.

The hinge, Figs. 7 and 8, is of novel construction. The eye 20 is bolted to the foundation. The pintle 21 is bolted to the gate. It consists of a plate, 22, by which it is bolted to the gate or gates, a central web, 23, and a pintle, 21, extending both ways from the central web, forming two pintles, 24. Each pintle 24 enters the recess 25 of one end of the eye or socket-piece 20. The socket-piece 20 is like a section of a tube having a central division-wall, so as to strengthen and divide it into two parts. The pintles 24 enter the adjacent ends 25 of each of two socket-pieces, 20, and the socket-pieces are secured firmly in place by bolts 26, and the pintle pieces by bolts 27. The upper side is cut away, as at 28, to provide room for the web 23, while below the edges meet. On the under side are projections 29, which are let into the foundation. This hinge is strong, cheap, and durable, and the parts fit together so as to be water-tight. By simply adding other pieces it can be extended to any desirable length. I prefer to make the meeting edges serrated or of equivalent form, so that the water which enters between them is caused to act as a packing to the joint and seal it.

The gate or gates 2 and 3 are provided with telescoping section or joint 30 (see Fig. 5,) which is formed by cutting the longitudinal courses of timber off with an even edge, as at 31, across the gate, and the transverse courses in like manner, as at 32, back of the ends 31 of the longitudinal timbers. The part between the two cuts 31 and 32 is not bolted, so that the interleaved ends are free to move on each other, and in case of the settling of the foundation 1 at any point the gate parting slightly, as at 30, is able to accommodate itself thereto. Heretofore the rigid structure of the gates caused them to stand straight, and not follow the foundation in case of its sinking. The joint 30 is water-tight, and is simple in form and construction, easy and effective in operation.

At the ends of the dam I form a water-tight joint between the gate or gates and the stationary abutment 33 by means of a movable timber or piece, 34, running transversely of the gate in a recess on its edge. Back of the timber 34 is a recess or channel, 35, which communicates to the water above by a large inlet-opening, 36, at the upper end, and has a smaller discharge-opening, 37, at the lower end. The water from above, entering the channel 35 by the large opening 36, causes the piece 34 to be pressed out against the wall 33

and form a tight joint therewith. The water escapes from the channel 35 by the small exit 37. There is little friction between the piece 34 and the wall 33, because as soon as the gate 2 begins to descend the pressure on 34 is relieved and it falls back in the recess 35. The discharge 37 is to prevent the collection of sediment in the recess 35, which might prevent the working of the piece 34.

In the end wall of the dam I make an open sluice, waterway, or tail-race, 38, Fig. 2, at such height as will permit all water which is not required to sustain the gates to escape from under them. When the gates are down, as in the position shown in Fig. 1, the water is admitted by the wickets under them. This raises and floats them up until they reach the position shown by Fig. 2. By that time the water having reached the sluice 38, which passes through the wall around the end of the gate, will flow freely through, sustaining the gates at that level.

A modified construction of the sluice 38 is shown by Fig. 4, where the outlet 39 in the wall is below the level of the water, the latter passing through the outlet 39 into a fore bay or well, 40, and thence over the bridge 41.

If desired, the discharge-opening may be controlled by a valve operated by a float.

It is apparent that the form, place, and details of construction of the sluice for relieving the gates from excessive pressure below
421 can be varied by the skilled constructor; but in all cases an open channel will be necessary when the water has reached a certain height or pressure under the gates.

I bring the operation and control of the wickets for admitting and discharging the water to and from the dam to one spot and put it under the control of one man. To the shaft of each wicket 42, Fig. 9, I attach a lever, 43, the other end of which is connected to a piston, 44, working in a cylinder, 45, from which a pipe, 46, leads to the operator's stand 47. The pipe 46 is connected to a compressed-air tank, 48, and is controlled by a suitable cock, 49. All of the wickets are similarly connected. The operator, having the cocks all within reach, can open and close the wickets at pleasure and with uniformity. I thus save in labor and time and secure great efficiency of operation. I prefer to use a three-way cock and a vacuum cylinder, 50, for relieving the pressure on the pistons 44, as thereby the action is more prompt. I can use steam, water or other liquid or gaseous medium for actuating the pistons by simply adapting the apparatus thereto.

I have also devised an automatic signal which shall show the exact height and position of the dam. On the end wall I erect a frame of posts, 51 and 52, and cross-piece 53. A stationary lantern, 54, flag, or other signal is placed on the cross-piece 53 at a suitable point. A rope or chain, 56, is fastened to the outer end of the rising gate 2, and passes up over pulleys 57, placed at the corners of the framing, and is provided with a weight, 58, at the other end. A lantern, 59, or other signal is fastened to the chain 56 in such relation to the signal 54 that upon the rising or falling of the gate 2 it shall change its relative position to the signal 54, and thereby

clearly indicate the exact position of the gate or dam. The operation of the signal by the moving of the gate itself insures absolute accuracy and great consequent safety.

The planking of the various parts of the foundations and gates which are exposed to water is fastened by wooden screw-bolts 60. Fig. 6, the threads of the male screw being preferably of a quicker pitch than that of the female screw, so as to force the parts tightly together. The bolts are made of dry or partially dried wood, and when exposed to the water will swell and make a very tight fastening.

I am aware that the crib-work has heretofore been constructed of timber upon a float or floor composed of several courses of dressed planking or timber, and also the guards and a horizontal apron have been arranged on the downstream side of a dam to arrest the silt and detritus and prevent the undermining of the dam by the backwash of the water, and do not herein claim the same; but

What I claim as my invention, and desire to secure by letters patent, is—

1. A dam-foundation constructed of several floors having intervening spaces divided into compartments by partitions formed of boards laid to cross each other at intervals and cemented between, and the compartments filled with stone or other suitable substance, substantially as and for the purposes described.

2. A dam-foundation composed of two or more floors, the space between the floors being filled with stone or like material, and the upper floor extending beyond the substructure to prevent the wash and percolation of the water from undercutting the foundation, substantially as specified.

3. A dam-gate hinge consisting of a double journal or pintle bolted to one part, working in the adjacent ends of a double-ended sleeve secured to the other part on each side of it, said sleeve having a central partition to strengthen it and separate the two ends of the adjacent pintles, substantially as and for the purposes described.

4. A rising dam gate or gates provided with a telescoping joint, substantially as and for the purposes described.

5. The combination, with a dam-gate and its abutment, of a movable timber-piece running transversely of the gate, and means, substantially as specified, for exerting a yielding pressure on the movable timber-piece, whereby a tight joint between the abutment and gate is obtained, substantially as and for the purpose specified.

6. A bear-trap dam having a relieving or open sluice extending from under the gates, so as to relieve them from unnecessary pressure, substantially as and for the purposes described.

7. A rising dam provided with hinged supports under the gates, substantially as and for the purposes described.

8. The combination of the wicket-stems with pistons connected thereto, cylinders, pipes leading to a common central office, and controlling-valves, whereby all the wickets may be operated by liquid or fluid pressure from a common center, substantially as and for the purposes described.

9. The combination of a rising dam with a signal chain or cord

attached thereto, and a lantern or other signal to indicate the condition of the dam by its change of position, substantially as and for the purposes described.

10. A wooden dam or foundation the courses of which are fastened by wooden screw-bolts, substantially as and for the purposes described.

In testimony whereof I have hereunto set my hand.

ARTHUR KIRK.

Witnesses:
JOHN S. KENNEDY.
JOSEPH MOLL.

422 THE UNITED STATES OF AMERICA:

To whom to all these letters patent shall come:

Whereas Josiah White, a citizen of the United States, hath alleged that he has invented a new and useful improvement in the locks for canals, etc., which improvement he states has not been known or used before his application, hath affirmed that he does verily believe that he is the true inventor or discoverer of the said improvement, hath paid into the treasury of the United States the sum of thirty dollars, delivered a receipt for the same, and presented a petition to the Secretary of State, signifying a desire of obtaining an exclusive property in the said improvement, and praying that a patent may be granted for that purpose, these are, therefore, to grant, according to law, to the said Josiah White, his heirs, administrators, or assigns, for the term of fourteen years from the nineteenth day of October, one thousand eight hundred and nineteen, the full and exclusive right and liberty of making, constructing, using, and vending to others to be used the said improvement, a description whereof is given in the words of the said Josiah White, himself, in the schedule hereto annexed and is made a part of these presents.

In testimony whereof I have caused these letters to be made patent, and the seal of the United States is to be hereunto affixed.

Given under my hand, at the city of Washington, this
423 nineteenth day of October, in the year of our Lord one thousand eight hundred and nineteen, and of the Independence of the United States of America the forty-fourth.

(Signed) JAMES MUNROE. [SEAL.]

By the President:
(Signed) JOHN QUINCY ADAMS,
Secretary of State.

CITY OF WASHINGTON, *to wit:*

I do hereby certify that the foregoing letters patent were delivered to me on the nineteenth day of October, in the year of our Lord one thousand eight hundred and nineteen, to be examined; that I have examined the same and find them conformable to law; and I do hereby return the same to the Secretary of State within fifteen

days from the date aforesaid, to wit, on this nineteenth day of October, in the year aforesaid.

(Signed) WM. WIRT,
Attorney General of the United States.

424 *Opinion.*

In the Circuit Court of the United States for the Western District of Pennsylvania.

ARTHUR KIRK
vs.
JOHN E. DU BOIS. } In Equity.

Before McKennan, cir. J., and Acheson, J.

MCKENNAN, *Cir. J.:*

The complainant is the patentee to whom was issued letters patent No. 268,411, dated Dec. 5, 1882, for a new and useful improvement in movable dams.

The patent covers ten claims, only one of which (the sixth) is alleged to have been infringed, and is, therefore, the subject of this controversy.

That claim is in the following words:

"6. A bear-trap dam having a relieving or open sluice extending from under the gates so as to relieve them from unnecessary pressure, substantially as and for the purposes described."

In the specification this relieving device is thus described: "In the end wall of the dam I make an open sluice, water-way, or tail race, 38, Fig. 2, at such height as will permit all water which is not required to sustain the gates to escape from under them. When the gates are down, as shown in Fig. 1, the water is admitted by the wickets under them. This raises and floats them up until they reach the position shown by Fig. 2. By that time the water, having reached the sluice, 38, which passes through the wall around the end of the gates, will flow freely through, sustaining the gates at that level." "A modified construction of the sluice is shown by Fig. 4, where the outlet, 39, in the wall is below the level of the water, the latter passing through the outlet, 39, into a fore-
425 bay or well, 40, and thence over the bridge 41." * * *

"It is apparent that the form, place, and details of construction of the sluice for relieving the gates from excessive pressure below can be varied by the skilled constructor, but in all cases an open channel will be necessary when the water has reached a certain height or pressure under the gates."

It thus appears that the whole object of the invention was to regulate the hyd-ostratic pressure under the gates or leaves of a bear-trap dam, so as to raise and retain them at the desired height or level, and if it does not appear that this desirable object was accomplished by any analagous method before the patentee conceived

and described the means of effectuating it, he is fairly entitled to all the benefits his patent was intended to confer upon him.

Three grounds of defence are set up and insisted upon by the respondent:

1. That the alleged invention is not useful aside from the desirability of the result contemplated by the patentee, and hence the ostensible value of any means conducing to its production, it is sufficient to say that no proof was presented by the respondent on this subject, and that, therefore, the presumption of utility arising from the patent itself is enough, without more, to meet all the requirements of the complainant's contention, and that he is entitled to the uncontroverted benefit of it.

2. That the patented device was in use by the late John Du Bois before the date of the alleged invention by the patentee.

It is alleged that this device was embodied in a dam described as the Chamber of Commerce dam and was in use there on the 23rd of December, 1879. On that day several members of the chamber of commerce of Pittsburgh and other persons, among whom was the complainant, visited this dam for the purpose of inspecting and examining it, and all of them who were witnesses testified that no such device as that described in the patent was then connected with it. On the other hand, quite a number of witnesses who had
426 been in the employment of John Du Bois testified that a relieving device substantially similar to the complainant's was then and there in use. In view of all the surrounding circumstances we are of opinion that the testimony in support of the complainant's hypothesis preponderates.

And this conclusion is confirmed by what transpired in the course of proceedings in the Patent Office.

In the spring of 1881 John Du Bois and Arthur Kirk each filed applications in the Patent Office for an improvement in bear-trap dams as described in the claim in controversy here. They were adjudged to interfere with each other and an interference was accordingly declared between Kirk and Du Bois. After the taking of testimony and the hearing of the parties the examiner of interferences decided "the question of priority of invention in favor of Kirk." From this decision Du Bois in writing waived his right of appeal. Now, although this decision was not conclusive against Du Bois, yet the decision itself, coupled with his acquiescence in it, is strongly pursuasive that it was right.

But one averment of decisive significance is made in the preliminary statement by Du Bois, filed in pursuance of the requirement of the office. In that he says "that as yet (Oct. 10, 1881) he has made no model and has built no dam similar to that shown in his pending case." How, then, is it credible that the contested invention could have been embodied in the Chamber of Commerce dam as early as Dec. 23, 1879?

In view of all this, we must conclude that the testimony in behalf of the def't is of the most doubtful character, and that the weight of all of it is with the complainant, and that this part of the defence must fail.

3. Has the def't infringed the complainant's patent? The proofs, in our judgment, demonstrate that he has; but we do not propose to discuss this question at any length of time or in any detail. It is sought to differentiate the complainant's and the def't- methods
by the argument that the complainant provides for the
427 overflow of the surplus water on the side of the dam opposite to that where it enters it, while in the def't's the overflow is on the same side at which the water enters; but the difference in location is immaterial, as the function performed, the result attained, and the mode of operation are the same so far as the essential purpose of the invention is concerned.

Upon the whole case a decree must be entered in favor of the complainant for an injunction and account with costs.

Filed Dec. 27, 1887.

H. D. GAMBLE, *Clerk.*

428 *Interlocutory Decree.*

ARTHUR KIRK *vs.* JOHN E. DU BOIS. } No. 39, of November Term, 1886. In Equity.

And now, to wit, December 31st, 1887, this cause came on to be heard at this term on final hearing; and thereupon, upon consideration thereof, it is ordered, adjudged, and decreed that the letters patent in said complainant's bill mentioned, to wit, letters patent No. 258,411, dated December 5, 1882, for an improvement in movable dams, which were issued to the said complainant, are as to the sixth claim thereof (which was the only claim alleged by the complainant to have been infringed by the defendant) in all respects a good and valid patent; that the said complainant was the first and original inventor of the improvement in said sixth claim of said letters patent described and claimed; that the said complainant is entitled to the exclusive right in and to said letters patent and in and to the invention and improvement secured thereby; that the said defendant by reason of the construction and use of movable dams containing the improvement set forth and claimed in the sixth claim of said letters patent No. 258,411, as in the said complainant's bill set forth, has infringed the said letters patent and has violated the exclusive rights of the said complainant thereunder, and that the said complainant do recover of him, the said defendant, all gains and profits by him made and the damages sustained by complainant by reason of such infringement, as well as the costs and charges of this suit, to be duly taxed, and that it be referred to Smith H. Shannon, Esq., residing at Pittsburgh, as master, to ascertain the amount of such gains and profits and of the damages sustained by the said complainant by reason of such in-
fringement; and, further, that a writ of injunction, according
429 to the prayer of said bill, be issued from and under the seal of this court restraining and enjoining the defendant and his agents, employees, servants, workmen, and all others acting by and

under his authority from any further infringement of the said sixth claim of said letters patent and of the exclusive rights of said complainant thereunder.

And it is further ordered that the complainant, on such accounting, have the right to cause an examination of said defendant *ore tenus* or otherwise, and also the production of the books, vouchers, and documents of the defendant, and that the said defendant attend for such purpose before said master from time to time, as said master shall direct.

BY THE COURT.

Filed Dec'r 31, 1887.

H. D. GAMBLE, *Clerk.*

430 In the Circuit Court of the United States.

ARTHUR KIRK
vsrsus
JOHN E. DU BOIS. } In Equity. No. 39. November Term, 1886.

Complainant's Testimony on Accounting.

And now, Tuesday, August 28, 1888, 10 o'clock, a. m., parties met pursuant to notice. T. W. Bakewell, Esq., appeared for complainant, and T. H. Baird Patterson, and W. P. Jenks, Esqs., for defendant.

Testimony of John E. Du Bois.

JOHN E. DU BOIS, called on behalf of complainant, having been duly sworn:

Examined by T. W. BAKEWELL, Esq.:

Int. 1. You are the defendant in this case?

Ans. I am.

Int. Please state the number and location of the dams which you have at any time owned or operated, or in which you have had an interest, and which are, or have been at any time, pro-
431 vided with an overflow device extending from under the gates, so as to prevent unnecesary or excessive water pressure thereon?

(Counsel for defendant, T. H. Baird Patterson, Esq., objects to question, because this is asking defendant to answer with regard to whether the construction and overflow of the dams used by him prior to the granting of an injunction by the court in this case is an overflow which extends from under the gates, which is a disputed question of fact, on which the defendant believes the decision of the court to be erroneous, and founded in a mistake of fact. The proper form of the question would be as to whether or not any of his dams have or had such construction as has been adjudged by the court to infringe the Kirk patent.

Question further objected to by W. P. Jenks, Esq., as to that part

of it which assumes as a fact that the defendant has dams which are provided with an overflow device extending from under the gates so as to prevent unnecessary or excessive pressure thereon. This fact must be proven, and not taken for granted, and as a fact is disputed and denied by defendant.)

(Objections overruled by master.)

Ans. I have none, and never had any in that form.

Int. 3. Please answer the same question with relation to any dams which you have or have had, or in which you have had an interest, and which have been provided with an overflow, the effect of which was to prevent excessive rise of water in the fore bay or in the chamber under the gates.

(This question objected to by counsel for defendant, in so far as it may assume the existence of an overflow or outflow from the chamber containing the leaves of what is called the bear trap, and in so far as it assumes the extent of the effect of an overflow from the fore bay.)

432 Ans. The dams owned by me are situated on different streams, some of which are quite small. My information concerning the matter relating to all of my dams is obtained to a considerable extent from the statements made to me by my employees. Any answers that I have heretofore made concerning the number and character of the dams I own and operate, I wish to have explained and corrected in accordance with the following statement, which is made from my best recollection, and from what I believe to be the most reliable information I have been able to obtain from the men in my employment:

The whole number of dams on the property which was conveyed to me on the 17th day of January, 1884, was fifteen. Of these, thirteen had what I call bear-trap chutes; only five of these bear traps had what is called overflows to the fore bays at different times at various heights. Since the 17th day of January, 1884, I caused four additional dams to be built with bear-trap chutes and with overflows to their respective fore bays. These four are known as the Tom Keen, the Jo Hand, the Fair Ground, and the Kilmer dams.

The Kilmer dam was built in September, 1884. The Tom Keen and Jo Hand dams were built in October, 1886; the Fair Ground dam in November, 1886.

The overflows in all my dams were closed up in December, 1887. Of the five dams having overflows when the property was conveyed to me on January 17th, 1884; two rotted out, and the bear-trap gates were removed. The dams thus removed are known as the old Jo Hand, or the Chamber of Commerce dam, which was removed in August or September, 1886. The other dam was known as the Shaffer dam, and was removed in the summer of 1887.

Int. 4. You have said that you acquired title to the property and dams on the 17th day of January, 1884; by whom were they then conveyed to you?

433 Ans. By my uncle, John Du Bois, who has since died.

Int. 5. You say that on January 17th, 1884, thirteen dams with bear-trap chutes were conveyed to you; did you use these dams from and after that date?

Ans. I did.

Int. 6. You say that only five of these had what is called overflows to the fore bays; were any of the other eight dams subsequently provided with overflows?

Ans. They were not.

Int. 7. Describe particularly the construction of those bear-trap dams which were not provided with overflows, distinguishing them in construction from other bear-trap dams.

(Question objected to in that form as incompetent, irrelevant and in no way connected with the issue in this case. The only question pertinent would be one which would go to the construction of dams, in which it is alleged, the patent rights of plaintiff are said to have been infringed.)

Ans. In addition to the bear-trap gates, there was a drop-gate placed in advance of the bear-trap gates.

Int. 8. Was this drop-gate attached in any way to either of the bear-trap gates?

Ans. It was not.

Int. 9. Please describe the arrangement and construction of this drop-gate?

Ans. It is usually an arrangement of horizontal boards bound together, or attached to timbers, and made to slide in a groove.

Int. 10. Will you please state the location of the five dams which were conveyed to you in 1884, and which were provided with overflows, referring if you please to "Exhibit Kirk Map," which is in evidence in this case?

Ans. Dams numbers 1 and 2 are below the mills, constituting two dams, and No. 3, No. 8 and the other one, I cannot identify
434 from the map, are above. We never had any names for Nos. 1 and 2; No. 3 was known as the Jo Hand or Chamber of Commerce dam; No. 3 includes No. 4 on the map. No. 8 is known as the Narrows Creek dam, the other one is the Shaffer dam; all are above the mill except Nos. 1 and 2.

Int. 11. What are the respective distances along the bed of the creek of these dams from the saw-mill?

Ans. I cannot give the exact distances from the mill.

Int. 12. Will you please ascertain these distances, and the distances of the other bear-trap dams having overflows, so that at a future meeting you may be able to inform the master?

Ans. I will.

Int. 13. Will you please state the location and names of the dams, which you have constructed since you acquired title to the property at Du Bois, referring as far as you can to the Kirk map?

Ans. Number 5 I take to be the new Jo Hand, which took the place of dam 3, the old Jo Hand, or Chamber of Commerce dam; the Tom Keen I take to be No. 7. The Kilmer, I would suppose to

be No. 6, although improperly located on the "Exhibit Kirk Map," and the Fair Ground dam cannot be located on this map. The Fair Ground is located below dam No. 3 on the "Kirk Exhibit Map."

Int. 14. State, as nearly as you can, the location of the eight dams which you got from your uncle, and which you say were unprovided with overflows?

Ans. On Gravel Lick run there are three; on Narrows creek, there are two; on Mt. Crocker run, one; and on Sandy creek, one; these runs are all tributaries of Sandy Lick creek. I omitted one on Narrows creek, which has since been removed.

Int. 15. Were any of these dams provided with a third leaf or apron?

Ans. Not to my knowledge.

435 Int. 16. Will you please give the dimension of the gates of the various dams that you have named?

Ans. I cannot answer, but will ascertain their dimensions.

Int. 17. The dams concerning which you have testified, that they were or are provided with overflows, are the same in construction as the construction adjudged by the court in this case to be an infringement of the Kirk patent?

(This question objected to in the present form by W. P. Jenks, Esq., for the reason that it requires the witness to give an opinion concerning the rulings of the court, and the application of legal principles to the facts.)

(Objection overruled.)

Ans. I believe the construction to be similar.

Int. 18. Have you, or have you had at any time, any interest in any bear-trap dam or dams, other than those you have mentioned?

Ans. I have no ownership in any other dams.

Int. 19. How many of the eight dams, unprovided with overflows, which were conveyed to you on January 17th, 1884, are still in use, in active use as bear-trap dams?

Ans. There are none of them in which the bear-trap dams are used.

Int. 20. With what have they been replaced?

Ans. They have been replaced with drop-gates, and with additional splash-boards on top of the drop-gates when necessary.

Int. 21. How long have these dams been disused as bear-trap dams?

Ans. I could not say. I think some of them were never used.

Int. 22. How is dam No. 1 now used?

Ans. It has a bulkhead in below it. It is entirely boarded up. When the floods pass down, we take all the boards down; that is the only time it is used as a bear-trap dam—at high water.

436 The bear-trap gates are entirely submerged on both sides—above or below. It is never used for the purpose of floating my logs. It is below my mills, and I have no use for it for that purpose.

Int. 23. State when dam No. 1 was bulkheaded up as you have described.

Ans. To the best of my recollection it has been boarded up a good many summers. I cannot say.

JOHN E. DU BOIS.

S. H. SHANNON, *Master*.

Adjourned to meet Friday, September 7th, 1888, at 2 o'clock p. m.

And now, Friday, September 7th, 1888, parties met pursuant to adjournment.

Present: T. W. Bakewell, Esq., for plaintiff, and Messrs. Jenks and Patterson for defendant.

JOHN E. DU BOIS—examination continued by Mr. BAKEWELL:

Int. 24. What are the respective distances along the bed of the creek from the saw-mill, of the dams referred to in your former examination?

Ans. Distance from the dam at the circular mill to the first dam above the plank road is 3,200 feet; thence to Jo Hand dam 5,750 feet; thence to Kilmer dam 22,750 feet; thence to Tunnel dam 26,400 feet; from the Kilmer dam to Narrows Creek dam is 9,240 feet, about. This is from a statement received from Mr. Nettleton. This is just the distance to the overflow dams, and refers only to those now in existence. There is one other dam, the Tom Keen dam on Luthersburg branch. I don't know the distance. These distances follow the windings of the creek. The location of the other dams, not in existence, is as follows: The Chamber of Commerce dam is between the mill and the Jo Hand dam, above
437 the Fair Ground dam; the Shaffer is between the Jo Hand and Kilmer dams; these are the two that are removed. There are also two dams at the mill.

Int. 25. Will you please give the dimensions of the gates of the various dams that you have named?

Ans. The Kilmer dam is 22 feet wide, that is the gate; the Jo Hand and the Tom Keen are the same width as the Kilmer; the Fair Ground dam is 18 feet; the Shaffer dam is 18 feet also, and I would not be positive about the Narrows Creek dam. I think it is about 18 feet. The dams at the mill I did not measure. I would approximate the width of these as about 18 feet. These dams are not used by me in floating logs or timber. These are the only dams of which I obtained measurements. In my previous statement I stated there were no aprons to any of these dams, but since, from a personal observation, I have learned that there was one, and there may be more. This was at the large dam at Narrows creek, but this dam never had any overflow.

Int. 26. Please state the respective heights of rise of the various dams you have named in your deposition.

Ans. The Kilmer dam rises 5 feet 6 inches, that is to the top of the leaf when up; the Tom Keen and Jo Hand the same, but the

Jo Hand has since been reduced six inches, made to stop six inches lower; the Fair Ground dam rises four feet; I have no further data as to the other dams.

Int. 27. Can you give any other data concerning the dimensions of the gates of any of these dams?

Ans. I cannot. I never measured them.

Int. 28. What is the nature of the course of the streams on which the bear-trap dams you have named are located?

Ans. The streams are very winding, and the banks are clay, and very low. The stream is a sluggish one.

Int. 29. Will you please state the cost of making the leaves of the various bear-trap dams that you have mentioned?

438 (Objected to as incompetent and irrelevant, for the reason that it does not bear upon the question to be determined by the master; the question to be determined is what advantage did the infringer derive from the use of the invention over what he had in using other processes then open to the public, and adequate to enable him to obtain an equally beneficial result.)

Mr. Bakewell states:

The purpose of the offer is to show that there is a saving to the defendant in the cost of constructing bear-trap gates provided with Mr. Kirk's invention, as compared with the constructions possible at the time when Mr. Kirk's invention was made.

Question modified by Mr. Bakewell as follows: In answering the foregoing question, I do not desire the amount as actually paid by you, but in estimating the cost, give the market value of the lumber employed, and the money value of the labor necessary in fitting the lumber together and constructing the gate.

(Counsel for defendant renews the same objection as before.)

(Objections overruled for the present.)

Ans. I am unable to answer the question.

Int. 30. Can you ascertain this fact?

Ans. The market value of the lumber may be obtained, but the labor cannot be. I will see if the fact can be ascertained. I am not sure that I can ascertain the amount of lumber used.

Int. 31. It has been stated that since you acquired ownership of the bear-trap dams to which you have testified, certain constructions embodied in patents of your deceased uncle have been used on the dams; will you please state what those patents were and the general time when those patents were used by you?

439 Ans. I don't understand the question, and am unable to answer. To the best of my knowledge the dams I obtained from my uncle, and the dams constructed by me were constructed after the designs of the patents obtained by my uncle, but I will examine the patents and answer more in detail. This applies only to overflow bear-trap dams.

Int. 32. When a drop-gate is used in connection with a bear-trap chute, the bear-trap leaves are not used, are they?

Ans. No, sir.

Int. 33. Will you please describe the construction and manner of use of a drop-gate or splash dam, in a dam built for log-driving purposes?

Ans. The construction I have already described. Its use when down is to collect a head of water, and is raised when they wish to splash or flood. The effect is to lower the water in the pool above. The water passes under the gate and produces a flood in the stream below. The logs come down under the gate, and are floated by the descending water.

Int. 34. How far toward the bottom of the stream does the movable drop, or splash-gate extend?

Ans. It usually extends down to the timbers made to receive it, which are usually low enough to drain the water from the pond. The whole gate is lifted up, and this lets out all the water from the upper pool.

Int. 35. What is the usual height of drop-gates used by you?

Ans. They are of various heights, and I could not say without measurement. They are approximately from four feet to twelve, and on one there is what is called boards. In a flood the water reaches the top of the gate. When the water is low it only rises part way.

JOHN E. DU BOIS.

Adjourned to meet Friday, September 21st, 1888, at 10 o'clock.

440 *Testimony of Arthur Kirk.*

And now, November 27th, 1888, parties met pursuant to adjournment.

Present: Thomas W. Bakewell, Esq., for complainant; T. H. Baird Patterson, Esq., and W. J. Jenks, Esq., for defendant.

Mr. ARTHUR KIRK, the complainant in this case, duly sworn, examined by THOMAS W. BAKEWELL, Esq.

Int. 36. At the time you made the invention, claimed in the sixth claim of your letters patent in this suit, what was the extent of your knowledge of the art relating to bear-trap dams?

Ans. My knowledge of bear-trap dams was gained largely by reading Col. Merrill's book and other works. I knew there was such things—such dams in existence. I knew about their construction.

Int. 37. At the time of making said invention, to what extent did you know what had been used before for the purpose of preventing accidents to bear-trap dams?

Ans. I did not know of any plan for preventing accidents that had proved a success, or was ever likely to prove a success.

Int. 38. What is the degree of your present knowledge of the state of the art relating to bear-trap dams prior to the date of your said invention?

Ans. I do not know of any plan that is in use now, or was in use then, to prevent accidents to dams, except my invention.

Int. 39. I want to know whether you are familiar with the art relating to bear-trap dams as it existed prior to the date of your invention?

Ans. I am.

Int. 40. Please state what, if any, devices prior to date of
441 your said invention had been used practically and successfully for the purpose of limiting the height of water in the fore bays of bear-trap dams below the level of the water in the upper pool, and what devices, if any, were known which were capable of such practical and successful use?

Ans. I know of none.

Int. 41. What then was the first device which was capable of practically and successfully accomplishing this result?

Ans. My invention—that is as described in my sixth claim. My sixth claim of my invention, which is a bear-trap dam having a relieving or open sluice extending from under the gates, so as to relieve them from unnecessary pressure, substantially as and for the purposes described.

Int. 42. What is the cost of applying to a bear-trap dam a relieving device such as described in your patent, and claimed in your sixth claim?

Ans. Practically nothing.

Int. 43. Why is this so?

Ans. It only requires the lower end of the fore bay to be left that much lower than the comb of the dam when up.

Int. 44. Taking into consideration the state of the art relating to bear-trap dams at the date of your invention, how could the result of maintaining the continual level in the fore bay lower than in the upper pool be effected without using your said invention?

Ans. I know of no other way.

Int. 45. Would it have been possible to effect this result by means of human labor as distinguished from automatic mechanical means?

Ans. It might have been regulated in a measure, but it would not be so successful, and would require constant care and watching.

Int. 46. What would be the cost of this regulation, as stated in your last answer?

442 Ans. It would require a man of some skill and intelligence to watch it day and night.

Int. 47. What would be the duties of this man?

Ans. His duties would be to watch the height of the water above the dam, and in case of thunder gusts or a storm which would raise the level of the water in the pool above, he would be required to adjust the gates to the varying pressures.

Int. 48. What would be the cost of employing a man to do this work?

Ans. The cost would vary with the cost of labor in the vicinity where the dam would be located. It would require a person of skill to understand the operation of the valves, and such a man

would probably be worth two dollars a day, as near as I can learn from the price of labor around Du Bois.

Int. 49. What would be the yearly cost of employing such man for the purpose described?

Ans. He would be required to be in attendance every day in the year, except when the dams are frozen fast. You can count two dollars a day, and for the year it would be seven hundred and fifty (750) dollars a year for a day man and the same for a man at night, which would make a total of fifteen hundred dollars a year.

Int. 50. From this, how much would you deduct for the period when the stream would be frozen fast, that is, if you would deduct anything?

Ans. Men for such positions are usually employed for the year without making any deduction for lost time.

Int. 51. Are you familiar with the dams on the Du Bois property since the defendant acquired ownership of them?

Ans. I know where some of them are located.

Int. 52. Will you please look at the testimony of John E. Du Bois, as given in this case, and state if you know the location of the dams?

443 Ans. I know the location of the Tom Keen dam, the Jo Hand dam, the Chamber of Commerce, the Kilmer and the Fair Ground, and the two dams near the saw-mill, and also the dam on Narrows creek, near Hoover's camp, and dam No. 8.

Int. 53. In order to control the level of the water in the fore bays of all these dams so as to keep the level in the fore bays continually lower than the level of the water in the upper pool, how many men would it be necessary to employ continually?

Ans. I think it would require a man at each dam.

Int. 54. Taking the number of dams as seven, what would be the cost of maintaining continually the difference in water level between the upper pool and fore bay by manipulation of the wickets in the manner as you have described above? I wish you to give the yearly cost.

Ans. The cost would be as follows: One day man two dollars per day—365 days—$750—one night man for the same would be $750, making $1,500 a dam, and for seven dams the cost would be $10,500.

Int. 55. You say you are familiar with the location of the dams you have named, how do you happen to be familiar with them?

Ans. I have been at all of these dam- repeatedly.

Cross-examination by Judge JENKS:

X Int. 56. You never built a bear-trap dam, did you?

Ans. I never built a bear-trap dam.

X Int. 57. Did you ever superintend the construction of one?

Ans. No, sir.

X Int. 58. Your knowledge then is only theoretical. The knowledge you have is obtained from reading and hearing others talk, and seeing the dams on the Du Bois property?

444 Ans. Yes, and seeing dams at other places.

X Int. 59. What bear-trap dam did you see at other places?

Ans. I saw two bear-trap dams at Brookville, Pa., two at Caledonia, one at Benezette, and have seen a large collection of models of bear-trap dams at the Pittsburgh exposition.

X Int. 60. You are not a lumberman, are you?

Ans. I am not.

X Int. 61. You were never engaged in driving logs?

Ans. No, sir.

X Int. 62. The dams on the Du Bois property are used solely for log-driving purposes, are they not?

Ans. Yes, sir; I think so.

X Int. 63. Can you state the distance between the dam near the mill and what is called the Jo Hand dam?

Ans. I cannot give the distance, probably a half of a mile.

X Int. 64. Within that half mile there are four dams, are there not?

Ans. I don't know. I would say four dams, including the Jo Hand and the lowest one at the mill.

X Int. 65. How far is it from the hotel at Du Bois to the Kilmer dam?

Ans. About three miles.

X Int. 66. State whether there is not a man living near the dam by the name of Kilmer.

Ans. I was told so.

X Int. 67. State how far it is from Kilmer dam to dam at the mouth of railroad where it crosses the Narrows creek.

Ans. I would say about a mile.

X Int. 68. How far is it from the hotel at Du Bois to the Tom Keen dam?

Ans. I don't know personally. I have no way of telling ex-
445 cept by the figures that were given me. I would estimate it at about four or five miles. I have been at this dam.

X Int. 69. Is there not a man living there by the name of Keen, that is near this dam?

Ans. There is a dwelling-house near it, said to be the home of a man by the name of Keen. I never saw him.

X Int. 70. By a bear-trap dam having a relieving or open sluice extending from under the gates so as to relieve them from unnecessary pressure, you mean to relieve them from all water in excess of what is necessary to support the gates at their full height?

Ans. Yes, sir.

X Int. 71. Will you please state whether, when you used the words in your patent relating to the outlet or relieving sluice, "If desired, the discharge opening may be controlled by a valve operated by a float," you meant it to be understood that a valve, if used in this way, as indicated, was not a sufficient method of controlling the water under the gates, so that no undue pressure could obtain?

This question asked for the *the* purpose of showing the plaintiff's knowledge of the prior state of the art, and also his knowledge of

the character and efficiency of devices prior to his invention, in regard to which he has testified in chief.

(Objected to by Mr. Bakewell for plaintiff, as incompetent and irrelevant.)

Ans. In the first place, I think that I never wrote this paragraph in the patent. I am sure that I did not. I never used it, but found it there. The clause in my patent covers the whole subject. "It is apparent that the form, place and details of construction of the sluice for relieving the gates from excessive pressure below can be varied by the skilled constructor. But in all cases, an open channel will be necessary when the water has reached a certain height or pressure under the gates."

446 X Int. 72. If the discharge opening is controlled by a valve operated by a float, then would the bear-trap dam still have a relieving or open sluice extending from under the gates as claimed in the sixth claim of your patent?

(Objected to by Mr. BAKEWELL as incompetent and irrelevant, because it calls for a construction of the patent and claim which has been settled by the court, and is not now in question.)

Ans. I never saw such a device, and it would depend entirely upon its construction.

X Int. 73. By what means do you bring the water to bear upon the leaves of what is called a bear-trap dam?

Ans. By means of a fore bay in one or both of the abutments.

X Int. 74. Is what is called a bear-trap dam, part of a dam or part of a chute, or is it what is called a species of water motor?

Ans. It is a part of the whole of a dam. It is not what I call a water motor.

X Int. 75. A fore bay is not a new device at all?

Ans. It is not by any means.

X Int. 76. How is water let in the fore bay?

Ans. By opening a wicket at the upper end of it.

X Int. 77. How is the water let out of the fore bay?

Ans. By a wicket at the lower end.

X Int. 78. Were there not two wickets to let the water in and two to let it out. Is there not often?

Ans. There may be two or more.

X Int. 79. Could you not control the height of the gates by the use of the wickets in the fore bay?

Ans. Yes, sir; it can be.

X Int. 80. Could you not control the height of water in the fore bay by the use of wickets?

Ans. It could be.

X Int. 81. Has it not always been that you could control the height of the gates, and the height of the water in the fore bay by the use of wickets?

Ans. It could always be done.

447 Adjourned to meet on Thursday, December 6th, 1888, at 10 o'clock a. m.

And now, Thursday, December 6th, 1888, parties met pursuant to adjournment.

Present: W. L. Pierce and T. W. Bakewell, Esqs., for complainant; and W. P. Jenks and T. H. Baird Patterson, Esqs., for defendant.

ARTHUR KIRK's cross-examination continued.

Examined by W. P. JENKS, Esq.:

X Int. 82. You speak of injuries to the dam. Now what injuries to the dam does the relieving sluice, as claimed by you, prevent?

Ans. It prevents the lower leaf from being forced out from the upper leaf, which would wreck the dam.

X Int. 83. In view of the size of the Du Bois dams, how much would it cost to repair the injuries you refer to, even if it did happen to any dam?

Ans. I could not make any estimate of the cost, until I saw what the damages were.

X Int. 84. Do not other parts in a chute of a dam often sustain injury from the waters passing over them?

Ans. No; not very often. There is always a reasonable wear and tear.

X Int. 85. Does not the pressure of water on a dam, as well as upon the bear-trap chute, depend upon the height of the water pressing upon it?

Ans. Yes, sir.

X Int. 86. Is not this pressure diminished by the discharge of the surplus water in a dam, and does not this discharge of water also operate to relieve the pressure upon, or under the bear-trap leaves, in case such leaves are used as a part of the chute?

(Objected to by Mr. BAKEWELL as obscure.)

448 Ans. The pressure upon a bear-trap dam depends upon the height of water upon it.

X Int. 87. Suppose the height of the water in the dam above is diminished by the opening of a wasteway in the dam, or by the removal of brackets, from the breast of the dam, does not this diminution relieve the bear-trap dam in proportion to the water thus taken out of the dam?

Ans. The pressure on a bear-trap dam is in proportion to the height of water above it.

X Int. 88. Is not the practice of diminishing the height of water in dams by opening of wasteways and the removal of brackets a very ancient and well-known one?

Ans. As far as I know, it has been used for a long time

X Int. 89. Has not the bear-trap chute or sluice been made and used for a lone time?

Ans. I believe they have.

X Int. 90. Can you tell me by whom the bear-trap chute or sluice was invented?

(Objected to by counsel for complainant as irrelevant and incompetent on the question of profits.)
(Objection overruled.)

Ans. I cannot.

X Int. 91. Don't you know, as a matter of history, that it was invented by Josiah White?

Ans. No. It was in use in France before Mr. White's time, and abandoned.

X Int. 92. Don't you know, as a matter of history, that Josiah White obtained a patent for it in 1819.

Ans. I don't know of his patent, but I know he used it.

X Int. 93. Don't you know, as a matter of history and of public notoriety, that it was used on the Lehigh river as early as 1819?

Ans. I do not know that it was used that early, but I know that it was used prior to 1862.

449 X Int. 94. From a book entitled the "Memoirs of Josiah White," published in 1873, do you not know this fact?

Ans. I see the following written in this book on page 57:

"I devoted myself for several weeks to form a plan of sluice that would answer, and be cheaply made, and safe at all stages of the water. I succeeded in producing the lock and sluice called the 'bear trap,' a name that workmen gave it, while we were experimenting with it on Mauch Chunk creek, to elude the curiosity of persons who teased them with inquiries as to what we were making. We put up about twelve of these locks and dams in 1819, and proved them, so as to determine that they would answer our purpose, and I took out a patent for them in the 12th month, 1819."

Memoir of Josiah White, pages 57 and 58, by Richard Richardson, 1873.

(Objected to by counsel for complainant because the book is not self-proving; and secondly, as irrevelant on the question of profits.)
(Objection overruled for the present.)

Ans. I do.

X Int. 96. Would not a valve operated by a float control the pressure and height of the water under a bear-trap dam?

Ans. Theoretically it should be so, but the only dam I ever knew was wrecked in the night-time, while depending upon the float.

X Int. 97. Cannot the pressure and height of water beneath the leaves of a bear-trap dam be controlled by the use of the inlet and outlet wickets?

Ans. Yes, sir.

X Int. 98. Are not those things which we call the leaves of a bear-trap chute, what is effected by and operated upon by the water?

450 A. Yes.

X Int. 99. Is not a fore bay that which is used to bring the water beneath the leaves of the bear-trap dam?

Ans. Yes.

X Int. 100. Is not the water let into the head of the fore bay by means of wickets, and let out by means of one or more wickets?

Ans. Yes.

X Int. 101. Is not the lower wicket, or, are not the lower wickets devised and used for the purpose of relieving and taking from the chamber containing the leaves the water which may have been introduced beneath them?

Ans. No. The function is to hold the water up to a desired level.

X Int. 102. Is it not also their function to relieve the chamber from the water introduced under the leaves?

Ans. It is the function to withdraw the water from under them when wanted.

X Int. 103. And are they not effectual when used for this purpose?

Ans. Yes.

X Int. 104. When you wish to let the bear-trap down, is it not necessary to close the wickets in the upper end of the fore bay, and open the wickets at the lower end of the fore bay?

Ans. Yes.

ARTHUR KIRK.

(Continued at X Int. 137.)

451 *Testimony of Richard A. Roberts.*

RICHARD A. ROBERTS, duly sworn, called on behalf of complainant.

Examined by W. L. PIERCE, Esq.:

I am a resident of Pittsburgh, and am by occupation a civil engineer.

Int. 105. What experience have you had in locks, dams and river works?

Ans. Three years and a half. I was the resident engineer of lock No. 4, Monongahela river, and had charge of the construction of it; and also had charge of the dam at Six-mile island, under Col. Merrill. I have, at different times, been connected with the surveys for the dam at Herr's island, and other work on the river.

Int. 106. At lock No. 4, did you employ wicket-keepers?

(Objected to by Judge Jenks as incompetent and irrelevant.)

Ans. Yes, sir; they were employed by the management of the Monongahela Navigation Company. That was not the name they went by; they were called lock-tenders, but they had the management of the locks and wickets.

Int. 107. What kind of a man is needed to tend gates and wickets?

(Same objection as to prior question made by Judge Jenks.)

Ans. It depends how the lock is constructed, and the duties of the lock-tender connected with the lock. They have to have skill and judgment. By the word judgment, I mean that if an accident should occur they should have the skill to know how to remedy it. At locks that have superintendents over them, the men can be taught.

Where there is no superintendent, the man has to take the whole charge himself.

Int. 108. Mention some emergencies which might occur in tending the gates and wickets?

452 (Same objection by counsel for defendant.)

Ans. If a snag should float down in the wicket, and get jammed in there, the man must know how to get it out; know how to handle the pole with a crook on it, and push the snag, with, or against the current, so as not to further jam the wicket. This is one of the frequent troubles; also, supposing a wicket-rod should break, he must have skill enough to put it under water. There are a great many things that might, and do occur.

Int. 109. What wages were paid at lock No. 4 to the lock-keeper?

Objected to by Mr. Jenks as incompetent, irrelevant, and as not the proper method of ascertaining damages.)

Ans. Some got forty-five dollars, and some fifty per month. There were four tenders and one superintendent at lock No. 4.

Int. 110. Where is lock No. 4?

Ans. Lock No. 4 is situated 42 miles up the Monongahela river; in Washington county.

Cross-examination by W. P. JENKS, Esq.:

X Int. 111. What stream is this lock situated on?

Ans. On the Monongahela river.

X Int. 112. It is one of the greatest navigable streams of this Commonwealth, is it not?

Ans. It is artificially so.

X Int. 113. You never examined the dams on the small unnavigable streams, did you?

Ans. I never have. Practically I have never examined them.

X Int. 114. You have no practical knowledge of the dams built on the small streams of this Commonwealth used for log driving purposes have you?

Ans. No, sir.

X Int. 115. You do not know whether it is necessary to
453 have men present at all times to watch and take care of them?

Ans. I do not, but will qualify my answer; in my judgment, it would.

X Int. 116. Small dams as well as large ones?

Ans. Yes, sir.

X Int. 117. In your testimony in regard to dam No. 4, do I understand you to refer to the watchful care of the four men as required to extend to the wickets and gates alone, or to the whole structure of the dam as well?

Ans. Yes, sir; to the whole structure of the dam, including the wickets.

X Int. 118. It is made navigable both for ascending and descending navigation, is it not?

Ans. Yes, sir.

X Int. 119. What is the length or width of the dam between the banks?

Ans. The dam is 1,089 feet wide, more or less.

X Int. 120. Craft are running day and night?

Ans. Yes, sir; in season.

X Int. 121. And this is the time the men are employed?

Ans. They are employed all the time.

X Int. 122. The lock gates are those generally used in canals?

Ans. They are not exactly the same. They are not bear-trap gates. They are not so intricate.

X Int. 123. Then you say one of the difficulties you experience is the running of brush, logs, etc., in the orifice of the wickets?

Ans. That is one of the dangers.

X Int. 124. Would the difficulty occur, or the accidents happen, were the wickets sufficiently protected by efficiently constructed rack bars?

Ans. Partly no, and partly yes. I will explain: The rack
454 bars themselves would keep some of the sunken logs from going into the wickets, and if they stay on the outside of the wicket they will stay against rack bars and will not get into the wicket frame.

X Int. 125. What is the size of your wickets?

Ans. There are two sizes there, one is 4 feet 1 inch in length, with 16 to 18 inches of clearance. This is my recollection of the size; the other wickets are smaller.

X Int. 126. Would you have us to understand that where a dam is constructed on one of the small streams of this Commonwealth, above the point where the stream is declared navigable, and the dam is a small one, not exceeding 18 to 24 feet in width, and the fore bay that introduces the water into the dam about three feet wide, and the wicket only 18 x 20 inches in size, located at the bottom of the fore bay, and protected from floating logs by a boom and also by sufficient rack bars, that such a dam and wicket as that requires constant attention by skilled workmen day and night?

(Objected to for the reason that the witness has not been interrogated as to the construction of the bear-trap dams, or has any familiarity therewith, and as improper cross-examination.)

Ans. I never saw a bear-trap dam. I would regard the attention necessary all the time, just the same as at other locks. Just the same as on other rivers. I don't understand the working of the dams.

X Int. 127. Do you regard it necessary to employ a man to constantly watch and care for the small dams built upon the unnavigable streams of this Commonwealth, used for raising water for driving saw-logs?

(Objected to for the reason that the character of the dam is not sufficiently specified in the question to enable a witness to give an intelligent answer thereto.)

Ans. I could not answer this until I should see the dams, and ascertain the duties they were required to perform.

455 Redirect examination:

Int. 128. What objection, if any, exists to the use of rack bars for a protection to the wickets?

Ans. Accumulation of water-soaked drift logs, or small particles.

Int. 129. What effect would this accumulation have upon the lock?

Ans. Could not fill the lock with water.

Recross-examination:

Int. 130. Does the same objection exist as to the small dams on the small streams of the Commonwealth, used for log-driving purposes?

Ans. I am not familiar with that kind of dams.

X Int. 131. How far below the source of the stream, known as the Monongahela river, is dam No. 4 located?

Ans. I am not able to say. I should think about sixty miles. It is about sixty or seventy miles from Cheat river.

X Int. 132. Does not the Monongahela river, above dam No. 4, receive the water of a great number of streams, and of considerable size?

Ans. Yes, sir; it does.

X Int. 133. Does not the Monongahela river often become a mighty stream above the dam No. 4?

Ans. It gets to be a stream of considerable size. In July last, it became a large stream, but it does not happen often.

X Int. 134. What is the maximum depth of the stream above No. 4 dam?

Ans. Forty-three feet.

X Int. 135. What was the width of the stream?

Ans. The general width of the stream is about one thousand feet. In high water it is about one hundred feet wider.

456 Redirect examination:

Int. 136. When you say forty-five or fifty dollars per month were paid to lock-keepers at lock No. 4, do you mean that this sum was paid to the superintendent or the lock-keepers?

Ans. This amount was paid to the lock-tenders. A superintendent is worth, as far as wages are concerned, three or four lock-tenders.

RICHARD A. ROBERTS.

Testimony of Arthur Kirk.

Cross-examination continued.

Examined by Judge JENKS:

X Int. 137. All of the Du Bois dams use a fore bay, and use wickets to bring the water into the fore bay, also wickets at the lower

end of the fore bay to discharge the water therefrom and let down the bear-trap dam after it has been elevated. Do they not?

Ans. All the bear-trap dams that I saw have.

X Int. 138. How do you get water to and under the leaves of the bear-trap dam that you claim to have invented or improved?

(Objected to as incompetent and irrelevant.)

The purpose of the offer is: The patent of itself does not show any method by which water is gotten beneath the bear-trap dam, or is taken from beneath to let down the chamber of the dam, and for the further purpose of showing the practical character and construction of the relieving device for which the plaintiff here claims his profits or damages, and the purpose of showing the practical working and advantage, or practical usefulness of the device, as testified to by the plaintiff in his examination-in-chief as com-
457 pared with all other practical relieving devices in use up to the time of his testimony before the master in this hearing, and for the purpose of cross-examining the plaintiff for the purpose of ascertaining his practical knowledge as a dam man, and of finding out exactly what is the specific device or improvement on the Du Bois dams in question, by the use of which, he swears his invention has been infringed.

(Objected to as far as the purpose of the offer is to show inoperativeness or lack of utility in the complainant's device, as these facts were conclusively settled by the decree of the court in this case, which decree could not have been rendered if the patented device would or could not work.)

(Objection sustained and question withdrawn.)

Adjourned to meet Monday, December 17, 1888, at 10 a. m.

And now, Monday, December 17th, 1888, parties met pursuant to adjournment.

Present: W. L. Pierce, Esq., for complainant, and T. H. Baird Patterson and W. P. Jenks, Esqs., for defendant.

Cross-examination of ARTHUR KIRK continued.

Cross-examined by T. H. BAIRD PATTERSON, Esq.:

X Int. 139. How does the water get from the fore bay, which has been described in the last question you answered, beneath the leaves or gates of a bear-trap dam or chute?

(Objected to as incompetent and irrelevant.)

(Objection overruled.)

Ans. It passes through an opening in the bottom of the fore bay—an opening of six inches deep by the length of the fore bay—under the leaves of the chamber.

X Int. 140. In the Du Bois dams in question, how is the height of the leaves or gates limited. How are they prevented from rising above a fixed height?

458 (Objected to as irrelevant.)

Ans. At the time of my invention there was no relieving device known. There were in use cleats bolted on the side of the abutments or gate chamber, and chains attached to the leaves and floats had been tried, but they had all proved unsatisfactory.

X Int. 141. Were there not also restraining devices or stops on the under side on the upstream gate or leaf, against which the under leaf would strike or lock itself to prevent it from rising beyond a predetermined height?

(Objected to as irrelevant.)

Ans. I never heard of it before my invention.

X Int. 142. Up to the time of the injunction last December in this case, did you ever hear or know of such restraining device as mentioned in the two prior questions?

(Objected to as irrelevant.)

Ans. I never heard of it in use until the last taking of testimony at Du Bois about six weeks ago; either on the Du Bois dams or any other dams, and never knew of them in use.

X Int. 143. Will you explain what is the invention which you claim in the sixth claim of your patent; describe it practically, and define what specific device or part thereof is it that you claim to be in use in the Du Bois dams in question here?

(Objected to for the reason that the scope and subject of the sixth claim has already been ascertained and defined by the court.)

(Objection sustained and question overruled.)

X Int. 144. In your answer to Int. 42, put by your own counsel, and in your answer to Int. 43, you say "it only requires the lower end of the fore bay to be left that much lower than the comb of the dam when up," that is referring back to Int. 42, which asks
459 you what is the cost of applying a relieving device to a bear-trap dam such as described in your patent; did you mean that the portion of your patented device which you claim was used on the Du Bois dams was simply the lowering to a certain extent of the lower end wall of such fore bay as you have hereinbefore described?

(Objected to for the reason (1) that the witness is not an expert in the construction of patents, nor has he been offered as such. (2) that the construction of the sixth claim, and the particulars wherein Du Bois has infringed the same, are fixed by the court.)

(Objection overruled for the present.)

Ans. Yes; or any other relieving device, for I do not understand the question.

X Int. 145. Is it requisite to the efficiency of your device that the upper valve or valves or wickets of the fore bay should be open or closed, and if so, which?

(Objected to as incompetent and irrelevant.)

Ans. My device will protect the dam whether open or closed,

provided there is an open channel between the chamber under the leaves and the water in the fore bay, and sufficient water to hold the leaves up.

X Int. 146. If the upper wicket or wickets are closed, and there is sufficient water to hold the leaves up, is there any necessity or value in your device at all under those conditions, provided the upper end and side walls of the fore bay are higher than the comb of the dam, and the water has not yet risen in the pool above the dam sufficiently to overflow the walls of the fore bay?

Ans. Yes; my invention is invaluable in all and any circumstances of a bear-trap dam, as it is a self-acting safety valve, no matter what changes may take place in the supply or demand of the water, and it works automatically day and night.

460 X Int. 147. Under the terms and conditions of the last question, what would your relieving device be carrying off, and wherein would its invaluable safety qualities consist?

Ans. It would be ready to carry off any injurious pressure that might come from any source.

X Int. 148. Then do I understand you, that until the water from the upper pool floods out the structure your relieving device will only be actually useful when the upstream wickets, or the portion of the fore bay upstream above the comb of the dam have been left open or destroyed by negligence or carelessness?

(Objected to as vague.)

Ans. I did not say anything of that kind. The function of my device is clearly defined and explained in my patent.

X Int. 149. If the upper wicket or wickets of the fore bay are closed, and there is only sufficient water to hold up the leaves of the bear trap, and the upper end and the side walls of the fore bay are higher than the comb of the dam, and the water has not risen in the pool above the dam sufficiently to overflow the walls of the fore bay; then until the water has so drowned out the structure; what will your relieving device at the lower end of the fore bay carry off, or what will be its practical value unless the fore bay upstream walls or the upstream wickets have been destroyed or left open by negligence?

Ans. No matter what the condition of the valves is, or whether open or closed, or the height of the water in the upper pool, if there is a surplus of water under the leaves of the dam, my device, as described in my patent, will carry off the surplus water and protect the dam from washing out. If there is no surplus water there, no more than to hold the gate up to the desired height, the device will not carry any water off; and under those conditions it is of no use, but if any change in any of the above circumstances, your device is there to protect the dam.

X Int. 150. How high above the comb or eave of the dam,
461 (bear-trap) are the side walls of the fore bay on each of the dams in question, at the Du Bois property when the dam is up to its full height?

Ans. There is no fixed rule. They varied from fifteen inches to two feet; maybe more.

X Int. 151. If the water in the stream above the dam rises to such a height as to overflow the upper end and side walls of the fore bays of said Du Bois dams, and thus flood out the structure of the dam, is your alleged relieving device at the lower end of the fore bay of any practical use or value under those conditions, and if so, why?

Ans. If there is any fall from the lower end of the fore bay to carry off the surplus water from under the leaves the dam cannot be washed out.

X Int. 152. Then, do I understand you to swear, that under these conditions of the last question, with water running over the comb of the bear-trap dam from fifteen inches to three feet high, that your relieving device would be of any practical value in preserving the lower leaf of the dam, and if so, explain how it would operate?

Ans. Yes, it would preserve the dam, because if it was running over the dam at that height, it would show that there was drainage to drain the surplus water from under the leaves.

X Int. 153. State if the chief value or efficiency of your relieving device at the lower end of the fore bay is not when the upper wicket or wickets of the fore bay are opened?

Ans. The device is not contemplated to protect the wickets. If they permit a surplus of water above what is needed to hold the gates up, then my device protects the leaves from any unnecessary strain.

X Int. 154. Unless the wicket or wickets of the upper end of the fore bay are opened, or some portion of the fore bay or dam
462 structure next the pool above the dam has been destroyed or injured, how can a surplus of water get beneath the dam leaves?

Ans. The wickets may be in bad condition, they may be imperfectly constructed, or out of order, or imperfectly closed, and they may permit too much water to enter under the leaves, and my device stands ready to carry it off.

X Int. 155. Then, what I understand you to say, is that this device is a wasteway to relieve the dam of all water not necessary to support the leaves of the dam?

Ans. My patent is a relieving device to relieve the dam from all unnecessary pressure not necessary to support the leaves.

X Int. 156. Is the expense of taking charge of a bear-trap dam, such as are erected in and on the Du Bois property in Clearfield county, having neither outlet or overflow as claimed for in your patent, greater than taking charge of bear traps on the same property with the outlet or overflow as claimed to be patented by you?

Ans. I do not know what the expense is of taking charge of such dams. I have made repeated attempts to find out, but every one appeared to be instructed to give me no information.

X Int. 157. Did you not state that you had been up and inspected the dams on the Du Bois property frequently?

Ans. Yes, sir.

X Int. 158. Did you visit the dams as well before as since the injunction in this case?

Ans. Some of them I did, and some I did not.

X Int. 159. Did not the dams with an overflow require as much care and attention as those without the overflow prior to the injunction in this case?

(Counsel for complainant objects to the question, inasmuch as it does not appear whether the care or attention has reference
463 to relieving the dams from excessive strain, or whether it refers to the general care of the structure or as to the raising and lowering of the leaves as required.)

Ans. I have no means of knowing. I only made flying visits to them.

X Int. 160. When you are about to raise water by the dams to float or manage logs during low water, or in a large part of the summer season, in order to raise the water in any reasonable time, would it not be necessary to close up the orifice or overflow claimed by you as your invention, in the dams on the Du Bois property?

Ans. No. My overflow device only permits the water to escape when there is too much under the leaves of the dam.

X Int. 161. Did you not say that your device proposed to permit all the water to escape from beneath the leaves of the dam, that was not needed to support the leaves at their full height?

Ans. As I understand the question; yes. My last answer answers this question.

X Int. 162. Would it not be necessary during low water, and what is called the dry season of the year, to close the orifice outlet or overflow in the lower end of the dam on the Du Bois property, if such orifice, outlet or overflow was made in that dam as suggested by you in order to raise or keep a sufficient supply and depth of water in the pool of said dam, to conveniently and with facility manage the logs in said pool so as to get them to the mills?

Ans. Not if made in accordance with my patent?

X Int. 163. Were such orifice, outlet or overflow, as suggested by you, made and kept open in said last-mentioned dam, and there were no excavations made to deepen the pool, would the water be of sufficient depth to conveniently and with facility manage the logs in the pool so as to get them to the mill, and would not such continued overflow, orifice or outlet being kept open, require a considerable additional expense to get the logs from said pool to the mills?

464 Ans. Not if made in accordance with my patent.

X Int. 164. Did you ever make any inquiry as to the number of creekmen necessary in attending to and taking care of all the dams on the Du Bois property, including the bear-trap, with or without overflows, and driving the logs in the creek through and over said dams prior to the closing up of the overflows immediately after the injunction last December in this case, and if so, from whom did you inquire?

Ans. Yes. I made inquiry every time I went near them; every

time I saw any men having connection with them. I do not know their names, but as soon as I began to make inquiry, they always had occasion to go some other place, and I could not get any information.

X Int. 165. These inquiries were made from the creekmen, and no other persons, do I understand you to say?

Ans. No; I inquired from Mr. Fuller, and from other persons likely to give information. I do not know the names of these persons.

X Int. 166. Did you ever go to the office, that is, Du Dois' office—and make inquiry on these subjects?

Ans. No; I don't know that I have.

X Int. 168. You state in your patent: "In the end wall of the dam I make an open sluice, waterway or tail race 38, Fig. 2, at such height as will permit all water which is not required to sustain the gates to escape from under them. When the gates are down, as in the position shown in Fig. 1, the water is admitted by the wickets under them. This raises and floats them up until they reach the position shown by Fig. 2. By that time the water having reached the sluice 38, which passes through the wall around the end of the gate, will flow freely through sustaining the gates at that level," and also "a modified construction of the sluice 38 is shown by Fig. 4, where the outlet 39 in the wall is below the level of the water, the latter passing through the outlet 39 into a fore bay or well 40, and thence over the bridge 41." Do not these words describ-
465 ing your device contemplate that the water is passing freely through the dam structure and therefor the inlet or upstream wicket or wickets are opened for the efficient working of your device?

(Objected to for the reason that it is an attempt to substitute the witness' opinion for that of the court as to the construction of the patent.)

Ans. No, the above quotation is only a part of the description of my device and does not cover the whole subject.

X Int. 169. Did you not state on page- 115 and 116 of testimony in Complainant's Record, which words are as follows:

"I first thought of doing that by a special chamber at the end for the dam for that purpose, connected with the space under the dam by means of an opening at the bottom of the end wall, but finding that would involve unnecessary expense I gave the preference to another plan, viz: By actual experiment find the elevation of water under the dam necessary to support it to the desired height, then by simply cutting an opening at that height between the chamber under the dam, when raised, and the tail race, necessary in all these dams to carry off the water from under the dam, when it was desired to lower the dam; I say, by simply making an opening between these two chambers of the same capacity of the inlet valve, which, when opened, permitted the water to get under the dam; I concluded it would be impossible for any damage to be done to the dam, by

the carelessness of the tender, or other causes permitting the inlet gate to remain open."

And does not that testimony show that the efficient working of your device was connected with and dependent upon the upstream wicket or wickets, or inlets being left open?

Ans. The testimony there above cited only relates to the
466 preliminary thoughts that I had on the subject, but my final invention is described in my patent and can be easily understood.

X Int. 170. State whether or not your above testimony is not quoted from the testimony taken before the examiner during the hearing, in the interference, after your application for a patent was in the Patent Office, and is not that testimony reaffirmed by you in your testimony before the examiner in this very case last year?

Ans. Yes.

Redirect examination.

Examined by W. L. PIERCE, Esq.:

R. D. Int. 171. In your examination-in-chief you have testified that it would require seven men at the Du Bois dam to take the place or do the work of your automatic device for relieving pressure underneath the leaves of the dam, do you wish to qualify this statement?

Ans. Why, yes, I have asked repeatedly for a correct map of the dams by the names they are known by, but it has never been furnished, and I was compelled to depend upon my memory, and mistook the Jo Hand dam to mean the dam otherwise known as the Fair Ground dam, when I said it was only one-half a mile from the Jo Hand dam to the mills.

R. D. Int. 172. Are any of the seven dams now in controversy sufficiently near together so as to require one common gate-tender, and if so would this fact reduce the number of men, to wit, fourteen, which you testified would be necessary?

Ans. Yes, there are two that it might be possible for one gate-keeper to attend in the daytime, and one at night for both dams, I mean the two below the saw-mill, but would by no means act as well as my invention, which would never sleep or neglect its duty.

R. D. Int. 173. You have stated that the cost of employing
467 a man to watch the stage of water and to take the place of your device would be two dollars per day, would any deduction be made from this figure if the men were employed for the year, and if so, state what their monthly wages would be if you are so informed?

Ans. No, I do not know as I wish to make a correction.

R. D. Int. 174. Assuming the Du Bois dams were not provided with your device, but were protected only by human labor and watchfulness, why would such watchfulness need to be constant?

(Objected to by counsel for defendant as incompetent and irrelevant to the Du Bois dams as testified to by the complainant in this case.)

Ans. A bear-trap dam of any size answers so quickly to any change of the water under it, that it is scarcely within the reach of human power to control it as well as my automatic device, for the openings are constantly liable to be obstructed by water-soaked drift, leaves, grass, twigs, etc., floating in the water, that the opening around the wickets may be changed in an instant, and this would affect the height of the dam quickly.

ARTHUR KIRK.

468 *Testimony of Col. Thomas P. Roberts.*

Col. THOMAS P. ROBERTS, duly sworn. Called on part of complainant. Examined by W. L. PIERCE, Esq.

Int. 175. You are the same Col. Roberts who has been examined on behalf of the complainant heretofore in this case?

Ans. Yes, sir, I am.

Int. 176. Since taking your former testimony, have you visited Du Bois and examined the bear-trap dams there, and particularly those which are in controversy in this suit?

Ans. Yes, sir, I have examined the dams at Du Bois. I spent a day there in November last.

Int. 177. Do you know of any device prior to the date of Kirk's invention that has been used practically and successfully for the purpose of limiting the height of water in the fore bay of bear-trap dams below the level of the water in the upper pool?

Ans. As far as my knowledge extends, Kirk's device is the only arrangement that would accomplish such an object. I know of no other device now that will accomplish it.

Int. 178. Assuming that Kirk's device was omitted from the structure of bear-trap dams of the defendant at Du Bois, how else could the level of the water be kept so reduced under the leaves of the dams as to constantly prevent injurious pressure thereon?

Ans. In my opinion it could only be done by constant attention to and manœuvering of the wickets or valves.

Int. 179. I understand you to mean, then, that the wickets would require constant manual attention to accomplish fully and the result obtained by Kirk's automatic relief?

Ans. Yes, sir, that is what I mean. By constant, I mean very frequent attention.

469 Int. 180. Would the attention be so frequent as to demand the attention of a man at the dam both day and night?

(Objected to because the witness has not shown himself competent to testify as an expert.)

(Objection overruled.)

Ans. Yes, sir; I think it would.

Int. 181. Are any of the seven dams now in construction so contiguous that one wicket-tender could watch more than one dam?

(Same objection continued.)

Ans. Yes, sir. I think there are two near the mill that one tender could successfully manage both.

Int. 182. Assuming two men at each dam, one for the day turn and one at night, there would be required for the seven dams to accomplish the same purpose as Kirk's automatic relief, twelve men, would there not?

(Objected to as above, and also to the form of the question as leading.)

(Objection overruled.)

Ans. Yes, sir.

Int. 183. Could these dams at Du Bois be closely watched by less than two men, one for the day turn and one at night?

(Same objection as before.)

Ans. I think not, as I understand it.

Int. 184. Will you give your reasons for your opinion why it would be necessary to employ twelve men on these seven dams to accomplish the same purpose as fully and effectually as Kirk's automatic relief?

(Same objection continued; also objected to as incompetent and irrelevant.)

Ans. The necessity for employing so many men arises from the fact of the frequent and rapid fluctuations of the level of the pool in logging-season operations; and from the further reasons
470 that these fluctuations would occur, and do occur, at such intervals that a man could not walk from one dam to another to keep the pool regulated.

Int. 185. What grade of labor would be required to perform the duties of a wicket-keeper at these dams?

(Same objection continued.)

Ans. It would require intelligent labor, I mean by that, that the employees ought to be able to read and write.

Int. 186. What experience have you had for employing labor for similar and analogous employments?

(Same objection continued.)

Ans. I have never personally employed labor for similar and analogous employments. I have seen a great deal of such labor and am familiar with it.

(Objected to for same reasons.)

Int. 187. I understand you to mean that while you have not been the actual hirer of such labor, that you are familiar with the nature of work of this kind?

Ans. Yes, sir, that is what I mean.

Int. 188. Do you know the price paid for such labor?

(Same objection continued, and for the further reason that it is not the proper method of fixing values.)

Ans. Yes, sir; such labor is generally paid for by the month. The wages vary from forty-five to sixty dollars per month.

Cross-examination by W. P. JENKS, Esq.:

X Int. 189. The Du Bois dams you speak about are upon the Sandy Lick creek and small streams emptying into it at and above the city of Du Bois?

Ans. Yes, sir.

X Int. 190. The streams are sluggish and crooked, the bottom land wide and swampy, and the bank of the streams quite low, so low that it is necessary to make artificial earth embankments of considerable length at the side of the dams in order to hold water, is this not so?

Ans. Yes, sir, that is correct.

471 X Int. 191. Each one of what is called the bear traps are of small size, and none of them exceed five feet and one-half in height; is this not so?

Ans. Yes, sir, this agrees with my recollection.

X Int. 192. The leaves, when raised to their full height, do not exceed twenty-three degrees, do they?

A. Yes, sir, that is right.

X Int. 193. And the greatest altitude not over five and one-half feet?

Ans. This is my recollection of the lift of the dams.

X Int. 194. Each and every one of these dams is used as what are generally called splash-dams, that is by lumbermen?

Ans. Yes, sir.

X Int. 195. These splash-dams that you speak of on the Du Bois property have what are called bear-trap leaves, have they not?

Ans. Yes, sir.

X Int. 196. These leaves have another name and they form what is called the chute of the dam, is it not so? That is, I mean the bottom of the chute when the leaves are down.

Ans. When the leaves are down the leaves form the floor or bottom of the chute.

X Int. 197. The injury to the dam or chute that Mr. Kirk's patent provides against is intended to prevent the under leaf by pressure from being swept from beneath the lap of the upper leaf, is it not?

Ans. That is one of the objects, but not the chief object. The chief object as I understand the design of Kirk's invention is a relieving device to relieve the leaves from under pressure or strain.

X Int. 198. Is not the pressure at the side of the leaf chamber as great as that upon the bear-trap leaves?

An. Yes, sir, at a corresponding level.

472 X Int. 199. In building dams of every description is it not always intended to make such part of the structure upon which the water presses or acts sufficiently strong to resist such pressure, and is it not regarded as a general rule that where any part of the structure so intended to resist the pressure of the water

and retard its flow is not built of such strength that such structure or part of structure is defective in its construction?

Ans. The first part of the question I answer yes, as to the other part I also answer yes.

X Int. 200. In the first place you have already said that the inlet and outlet wickets properly managed, would of themselves effectually control the height of the water beneath the leaves of a bear-trap dam, is that so?

Ans. That is correct. The statement is correct.

X Int. 201. Is not a side stop a well-known method of checking the upward rise of the leaves?

(Objected to as irrelevant and incompetent.)
(Objection overruled.)

Ans. Yes, sir. they are well known.

X Int. 202. How long have they been in use?

(Objection repeated.)

Ans. I do not know.

X Int. 203. These side stops antedated Kirk's invention, did they not?

Ans. I do not know.

X Int. 204. Was there not also a device as early as January 21, 1873, a device used by one H. Wehner, to wit, that of bolting a heavy transverse timber to the under side of the upstream leaf near its top edge against which timber, the lower leaf would come in contact, and its rise would be thereby checked?

(Objection repeated.)

Ans. I cannot be responsive to the date, but I know there were such arrangements. I do not know when.

473 X Int. 205. Was there not such a device as a chain used to keep the leaves down?

(Objected to as before.)

Ans. Yes, sir.

X Int. 206. Was there not also a device known as a float, which was used to open and close the wickets so as to prevent the water from entering beneath the leaves of the dams, and also to open and close the lower wickets which discharged the water from beneath the leaves?

Ans. Yes, sir, there has been proposed such devices, not only for bear traps, but for others, but I cannot recall a place where they have been in successful practice.

X Int. 207. It requires less powerfully operative forces and devices to control the elevation of the leaves of a small bear-trap dam than in a large one, does it not?

Ans. Yes, sir.

X Int. 208. It requires less powerfully operative means to prevent the rise of the leaves of a bear-trap dam in a sluggish stream than it does in one which rises with great rapidity?

Ans. No, sir. The power will be the same at equal heights. The strain on the gates will be the same at equal heights.

X Int. 209. When the stream is up at flood tide in its length through the Du Bois property, is there any considerable pressure under the leaves of the bear-trap dam?

Ans. It is very much diminished at that time.

X Int. 210. Would that not be the time, if any, that injury from floating logs and drift-wood would happen to the dams?

Ans. Yes, sir, principally at that time.

X Int. 211. Suppose the bear-trap leaves were constructed of such length that they would considerably when at their full height, overtop the fore bay or walls of the leaf chamber, or the breast of the dam, and they were protected by sufficient side stops and the
474 lower one by a crowbar firmly fastened to the under side of the upstream leaf near the top of said leaf, so that the under leaf in its upward pressure would be arrested by the side stop and cross-bar, would there be, under such circumstances, any considerable danger of the under leaf being swept from beneath the lap of the upper leaf?

(Objected to as irrelevant.)

Ans. Under the circumstances as stated, the under leaf could not be swept away.

X Int. 212. Would not under such circumstances the discharge of water over the breast, and other parts of the dam, perform the part of a great and effectual wasteway?

(Objected to as irrelevant.)

Ans. Under these circumstances it would.

X Int. 213. You speak of Mr. Kirk's device as a relieving device; by this is meant such an opening as to permit the water beneath the leaves of a bear trap, after it has raised the bear-trap leaves to their full height, to run freely from beneath the leaves of the bear trap.

(Question withdrawn.)

X Int. 214. You have seen the Du Bois dams, you say?

Ans. I have.

X Int. 215. Have you not noticed as a fact in the Du Bois dams, that when the water in the pool has been introduced through the upper wickets the lower wickets being closed, the dam having been down, the water then thus introduced brings the dam to its full height, then the water in the pool above is two feet lower than the apex of the dam when thus elevated. Is this not so?

(Objected to as having no bearing whatever upon the merits of Kirk's device as compared with any device in existence at time of Kirk's invention.)

(Objection overruled.)

Ans. I know the dam can be raised to its full height when the

water in the pool above is nearly two feet lower than the apex of the dam.

475 X Int. 216. That at that height there is sufficient water under the leaves of the dam to hold them up to their full height?

(Same objection repeated.)

Ans. Yes, sir.

(Question withdrawn.)

X Int. 217. Does not Mr. Kirk's device propose to relieve the chamber of the bear trap from all water after it reaches such a level in the dam chamber as will hold the leaves up to their full height?

Ans. That is the idea as far as I understand it. That is one object, but the principal object is to relieve the leaves from undue pressure, and that undue pressure may not come on the gate and will not come on the gate until the water has reached a higher level than three and one-half feet under the gate, then the pressure would commence.

X Int. 218. But when the pressure does commence does not Kirk's device propose to discharge from the leaf of the bear trap all of the water above the line of pressure?

Ans. Yes, sir.

(Objected to as irrelevant and incompetent.)

Adjourned to meet Thursday, December 20th, at 9 o'clock a. m.

476 And now, December 20th, 1888, parties met pursuant to adjournment; same parties present.

X Int. 220. Are not the leaves of the gates of the bear-trap dam on the Du Bois property about six inches in thickness?

Ans. Yes, sir.

X Int. 221. That would make a difference between the apex of the gate over and above the height of the water under the gates when the gates are fully up and the water under them as high under the gate as high as it can rise of twelve or more inches, would it not?

Ans. It would probably make the apex of the leaves about fourteen inches above the height of the water under the gate.

X Int. 222. Then I understand that the relieving sluice of the Kirk patent must be so constructed and of such size as to permit the free escape and discharge of the water coming under the bear-trap leaves, so that there shall not be any pressure of water beneath the gates at a higher point than fourteen inches below the apex of the leaves when they are raised to full height?

(Objected to for the reason that the necessary elements of the Kirk construction and what are its essential features as regards this infringement, have been settled by the court and that it is not competent to ask this witness to set forth any other or different opinion as to such construction than has been delivered by the court.)

Ans. I don't understand the question. It ought to be large enough to let out all the water freely that comes in from the inlet wicket.

X Int. 223. This being a surface discharge and the inlet being at the bottom, the orifice of discharge would have to be considerably larger than the inlet wicket, would it not?

477 Ans. It would depend upon circumstances. It is a theoretical matter altogether. It would be better larger, however.

X Int. 224. You have testified to the number of men that would be needed to take charge, and successfully operate the bear-trap dams on the Du Bois property, that had not the device of an outlet or overflow claimed to be patented by the complainant, Mr. Kirk, have you ever had any practical experience on those erected upon the Du Bois property?

Ans. No, sir.

X Int. 225. Have you ever had any practical experience in driving logs?

Ans. No, sir; but I have seen a great deal of log-driving in Wisconsin, on small streams like the Du Bois stream, something similar.

X Int. 226. That the streams flowed through swamps and in every respect similar to those about Du Bois, winding and serpentine?

Ans. Yes.

X Int. 227. Could not each one of those Du Bois dams be changed with great facility into a wicket dam operated by adjustable boards?

(Objected to as irrelevant.)
(Overruled.)

Ans. Yes, sir.

X Int. 228. Have you ever practically operated a splash-dam using bear-trap gates or a splash-dam using adjustable boards, or a splash-dam using drop-gates, or a splash-dam using barn-door gates?

Ans. Not for the purpose of driving logs.

X Int. 229. Have you ever had the control of any dam used for log-driving purposes?

Ans. No, sir.

X Int. 230. You do not know then the number of men that it would take to operate these dams when they are used for driving logs?

Ans. No, sir; I would not like to say.

478 X Int. 231. You have talked of having seen log-driving in Wisconsin on small streams where the adjoining banks were swampy, and you have also spoken of the Du Bois lands through which the Sandy Lick passes and the adjoining lands also wide and swampy, could you inform me how high the banks of the Sandy Lick creek are where it passes through the Du Bois property?

Ans. I should say from three to five feet.

X Int. 232. When there is three feet of water in the Sandy Lick creek in the entire stream extending through the Du Bois property, how much back water would then be on the lower leaf of the bear-trap dams?

(Objected to as improper cross-examination.)

X Int. 233. You have testified that it took twelve men to take charge of and successfully keep the seven bear-trap dams without overflow on the Du Bois property?

Ans. Not directly. It would require that many men to keep these dams as well relieved as the Kirk device would automatically relieve.

X Int. 234. If the bear-trap leaves have been left down in November, and are *remained* to continue down until the first of April when the ice breaks on the stream, are men needed then to take charge of the dam?

(Objected to.)

Ans. No, sir.

X Int. 235. When the leaves are let down and the dams are not actually used for log-driving purposes, does it require men to take charge of and watch and keep them?

(Objected to for the reason that the period of the shut-down is not specified in the question.)

Ans. I think it would.

X Int. 236. Are not the men employed to drive logs sufficiently skillful, and is not a part of their business while driving logs to take charge of and manage bear-trap dams on the Du Bois property?

Ans. I don't know.

479 X Int. 237. Is it necessary to employ men specially to take charge of the Du Bois dams when they are not using them for splash or log-driving purposes?

Ans. If the time of their disuse was for a protracted period, I would say that it would not be necessary.

X Int. 238. Do you remember the day at Du Bois that what is called the fair-ground dam was flooded out by back water?

Ans. Yes.

X Int. 239. It is not, then, necessary to watch a dam, particularly when the back water reaches to the top of the lower leaf, at that particular period?

Ans. I could not judge of the strain at that period; I would say there was not so much care.

X Int. 240. The day you visited the Du Bois property—that is, the dam—did you notice whether or not the overflow on them had been raised up at the lower end of the fore bay, which is claimed to be the form of Kirk device, to have been in use on these farms, at the time you visited these dams, did you find any men in charge of these dams?

Ans. To the first part I answer yes; to the latter, no.

X Int. 241. On the occasion of your visit, did you notice how high the side fore-bay walls are; the upstream end wall of the fore bay were above the comb of the dam when fully up?

Ans. Yes, sir. I speak from memory. Eight feet was about the total height of the fore bay, and about two and a half by three.

X Int. 242. If one of these bear-trap dams were fully down and the log-driver would start to elevate it by closing the down-stream wicket or wickets of the fore bay and opening the upstream wicket or wickets, until the water in the pool had reached a point about two feet below the comb of the dam, which would then be fully up against the top cleats and the upstream wicket or wickets would then be closed tightly and locked, of what useful value in
480 carrying off surplus water, under those conditions, would the Kirk device be?

This question being asked in regard to the Du Bois dams, with fore bays of the height as stated in witness' last answer.

Ans. Under the conditions of the circumstances there would be no surplus water to be removed by any device.

X Int. 243. For the purpose of the useful operation of the Kirk device, as claimed to have existed on the Du Bois dams, does it make any practical difference whether the upstream wicket or wickets are opened or closed?

Ans. As a matter of fact, it is impossible to keep these wickets perfectly tight. In the case of the wickets being closed, it would relieve the water from infiltration and leakage around the wicket. It would then act as a relieving device.

Int 244. Do I understand your testimony correctly to be to the effect that before the introduction of this relieving device of Kirk's bear-trap dams became full, and an enormous pressure was exerted upon the upper and lower leaves, and extending to the hinge of the upper leaf, so great as to cause the lower leaf to fall over down-stream; to prevent this various devices have been experimented with, such as chains to hold the leaves on the floor, and other re-straining devices, and that these other devices were in use before Kirk's invention?

Ans. Yes, sir; some of it. I am not certain about dates.

Int. 245. Do I understand you correctly in your testimony to mean that Kirk's device practically applied to a bear-trap dam, consists of an outlet of a greater capacity than the inflow at that elevation of the dam would amount to, and that the water would level back from the free discharging points of said outlet and raise no higher in the fore bay or under the gates, explaining whether you mean the free discharging point, the lower edge of the outlet or overflow?

481 (Objected to, that the question goes to the scope of Kirk's invention, and is incompetent.)

Ans. I think the intention is to keep the outlet of sufficient capacity to maintain the water in the fore bay at the same level as the water on the under gates. Of course this idea does not preclude the existence of a current from under the gate in the direction of the outlet. It was therefore, theoretically, not level on the surface of the water. The outlet can be made of any dimensions, or shape, or rectangular. The level at the outlet would depend upon the amount of water running in.

Redirect:

R. D. Int. 246. In your cross-examination you stated in substance that you were not familiar with the logging operations at Du Bois, and that, therefore, you did not know how many men it would take to operate the bear-trap dams for such logging purposes. Did you or not intend this statement as a qualification, or referring to your statement-in-chief, wherein you stated that in your opinion it would take twelve men to the wickets of the seven dams at Du Bois to accomplish as effectively the automatic relief secured by the Kirk device, in other words, were you talking about the same matter in both your answers?

(Objected to as above.)

Ans. I was not talking about the same matter in the two answers. I was distinctly referring, or attempting to refer to my examination-in-chief.

THOMAS P. ROBERTS.

Attest: S. H. SHANNON, *Master.*

Counsel for complainant state that the case-in-chief is closed with right to offer record in evidence if not already in evidence.

Adjourned to meet Monday, January 7th, 1889, at 3 o'clock at Pittsburgh.

482 In the Circuit Court of the United States.

ARTHUR KIRK *vs.* JOHN E. DUBOIS. } No. 39. In Equity. November Term, 1886. On Accounting.

Defendant's Testimony-in-chief.

And now, January 7th, 1889, parties met pursuant to adjournment.

Present: W. L. Pierce, Esq., for plaintiff, and W. P. Jenks, Esq., and T. H. Baird Patterson, Esq., for defendant.

Act of assembly of April 10th, 1826, P. L. 369, declaring Sandy Lick or Red Bank creek a public highway. Section 2, of said act offered in evidence by W. P. Jenks, Esq., on behalf of defendant.

Objected to as irrelevant and incompetent by counsel for complainant.

Counsel for defendant offers in evidence the will of John DuBois.
Also deed of John DuBois to John E. DuBois.
Also letters patent No. 36,342, dated Sept. 2, 1862.
Also letters patent No. 229,682, dated July 6, 1880.
Also letters patent No. 236,488, dated Jan'y 11, 1881.
Also letters patent No. 251,771, dated Jan'y 3, 1882.

483 JOHN E. DU BOIS, duly sworn.

Examined by W. P. JENKS, Esq.:

1.—1 Q. Please state whether or not the dams in question are situated in Clearfield Co.

Objected to as irrelevant.

A. Yes, sir; in Clearfield Co.

2.—2 Q. About how far is the one lowest down the stream east of the Jefferson Co. line?

A. About two miles.

Objected to as incompetent and irrelevant.

3.—3 Q. Please state whether the Sandy Lick above the Jefferson Co. line is or is not a very crooked stream.

A. It is a very crooked stream.

4.—4 Q. Are the banks not low?

A. The banks are very low.

5.—5 Q. State whether or not the bottom lands are of very considerable breadth.

A. Yes; they are quite wide; in some places they are a half mile wide.

6.—6. Q. State whether the stream is a very sluggish one.

A. The current is not swift; it is very sluggish.

Counsel for defendant offers in evidence map showing the location and position of the dams (showing location of four dams only) and marked Exhibit No. ——.

6½.—6½ Q. Is this a correct map?

A. I believe the map is a correct draft of the locality.

Counsel for complainant request that the map be identified before used in evidence.

7.—7 Q. For what purpose are the bear-trap dams built and for what purpose are they used?

A. They are used for the purpose of raising artificial floods in the creek for driving logs.

8.—8 Q. At what time are they used? When there is sufficient natural water or when there is not sufficient natural water?

484 A. They are only used when there is not sufficient natural water in the creek to drive the logs.

9.—9 Q. What relation do the two dams below the mill sustain to the pool at the mills?

A. They are built there to make or raise the pool.

10.—10 Q. You can state where the logs are brought by the railroad and also by the stream above the mills?

A. They are brough- down the stream into the pond, and also dumped from the railroad into the pond.

11.—11 Q. You can state the proportion of logs manufactured in the mills that are brought down the stream and the proportion that are dumped from the railroad?

A. Nearly all the logs manufactured in the mill are brought into the pool at the mills and from the pool drawn to the mills.

12.—12 Q. You can state if the logs differ in size and how large some of them are?

A. The logs vary from ten inches to five feet in diameter.

13.—13 Q. You can state whether they vary in length and how much?

A. They vary from 6 to 80 feet.

14.—14 Q. In order to enable the men who bring the logs immediately to the mill to bring them with facility what depth of water should be kept and maintained in the pool?

A. Anywhere from 4 to 6 feet.

15.—15 Q. You can state what is required at all times, what is the average height required at all times during the sawing season?

A. I would say about five feet.

16.—16 Q. You can state whether the bottom of the pool is irregular in its depth?

A. Yes it is, sometimes it changes by sediment settling in it.

17.—17 Q. State what effect in causing the accumulation of sediment in different parts has the falling of the logs from the railroad into the pool?

A. It washes the sediment out from where the logs are thrown in, and throws it up at other places.

485 18.—18 Q. You can state what the height of these two lower dams was?

A. I would say about four and one-half feet.

19.—19 Q. You can state whether the land adjoining the pools is low, and what has to be done to hold the water in the pool beside to elevate the dams?

A. The banks are not high, and we have to raise embankments around the pools.

20.—20 Q. You can state what is the business of the men who manage the logs after they are brought into the pools?

A. They sort them and take them to their proper places—that is to the mills and sometimes to the pockets adjacent to the mills.

21.—21 Q. When does the sawing season usually commence?

A. It varies; beginning sometimes in March and sometimes in April.

22.—22 Q. When does it close?

A. When we run out of logs, or when it freezes up, usually in November.

23.—23 Q. Where are the creek men employed during the sawing season in sorting the logs and bringing them to the mill?

A. They are employed along the Sandy Lick creek and at the pool.

24.—24 Q. What is their number?

A. The number is five.

25.—25 Q. Who do you understand to have charge of all the dams during the sawing season the year before the injunction and the year since the injunction?

Question so far as it concerns the use of the dams prior to the injunction is objected to, inasmuch as the complainant had in use on each of the seven dams an automatic relieving device, and it is therefore immaterial how many men he had employed at that time; and the question is further objected to as to the time after the injunction, inasmuch as the complainant asserts defendant is still infringing.

Objection overruled.

486 A. The foreman of the creekmen has had charge of the dams since the injunction and before the injunction, that is of all the dams. The foreman is one of the five men.

26.—26 Q. Who raises and discharges the artificial flood, drives the logs, and sorts and manages the logs after they are brought into the pool and conducts them to the points where they are taken into the mills?

A. The creekmen.

27.—27 Q. What if anything is necessary during the dry season, with regard to the lower dams, in order to keep the water of sufficient height in the pool?

A. We sometimes put in a bulkhead or plank in the leaf chamber below the leaves and cork it up tightly to prevent the waste or loss of water. We build the bulkhead higher than the dam when fully up.

28.—28 Q. You can state whether this is necessary to enable the men to have water enough to float and bring the logs from the pool up to the mills?

A. It is necessary when the water is scarce during the dry season.

29.—29 Q. You can state what effect it would have upon the running of the mills if five feet of water was not constantly kept in the pools, or about that.

A. We could not succeed in getting logs to the mill.

30.—30 Q. What effect would that have upon the running of the mills?

A. It would compel the stopping of the mills and throwing the men out of work.

31.—31 Q. How much water ought to be in the body of the stream to make what would be considered a good driving flood?

A. Between five or six feet of water. We like to have the creek bank full, and the depth varies from 4 to six feet.

32.—32 Q. When there is from natural cause not a sufficient flood to float logs, how do you use the bear-trap dams?

A. They are used for the purpose of raising artificial floods.

33.—33 Q. State if any earth embankments are made ex-
487 tending from the bear-trap dam across the lower to the higher lands?

A. Yes, sir, there is.

34.—34 Q. State how high the water must be raised by the dam to have any reasonable effectiveness to drive logs.

A. About five and one-half feet.

35.—35 Q. State whether it must or must not be on a level with the comb of the dams when raised to its full height.

A. It is usually raised to that height before making a drive.

36.—36 Q. When there has been a full head of water raised in the dam and the stream is low, does or does it not require one or more than one artificial flood to bring the logs down the stream to the pool at the mill, considering distance of the dams apart?

A. It requires more than one flood.

37.—37 Q. What effect would any considerable leak or opening in one of the bear-trap dams below the comb of the bear trap, when elevated to its full height, have when the water is low in the stream, in effecting the efficiency of the dams, that leak or orifice remaining constantly open below the comb of the dams, and the leak or orifice commencing 18 inches below the comb of the dams; that is, what effect would it have in protracting the time in which the dam would fill?

A. It would take the dam much longer to fill with that orifice there remaining open, and at times would entirely prevent the pool from becoming full.

38.—38 Q. As the dams are constructed on the Du Bois property, when there is water sufficient in the pool above simply to raise the leaves to their full height, how much higher is the apex of the leaves when thus raised to their full height against the stops than the water in the pool when it first brings the leaves up to the full height against the stops?

A. About two feet.

39.—39 Q. Will the bear-trap leaves be held firmly against the stops, when the water in the pool and chamber is about two feet lower than the apex of the leaves when fully up against the stops?

A. Yes.

488 40.—40 Q. Can you tell the size of the wickets in the Du Bois dams?

A. I don't remember the exact size.

41.—41 Q. Do you remember the breadth of the fore bay and its length?

A. The fore bay is about three feet wide and extends almost the length of the dam.

42.—42 Q. What does your observations and experiments that you have seen made show, with regard to the control which the wickets in the fore bay give over the elevation and depression of the leaves, and the pressure of the water under them in the dams as constructed on the Du Bois property?

Objected to, as the question does not show whether the wickets have or have not a constant attendance.

Objection overruled.

A. The wickets may be made to control the pressure and hold the leaves at any desired height or point, without any overflow.

43.—43 Q. State as near as your recollection serves you, what time the dry season commences and what time it usually terminates.

A. I believe it starts sometimes in the latter part of May or June

and lasts until about November; it varies, of course, with the seasons.

44.—44 Q. You can state what effect the dry season has upon the water of the Sandy Lick creek about Du Bois.

A. It greatly lessens the amount of water flowing in the stream.

45.—45 Q. You can say what kind of a season for dryness was the season preceding 1887, as you remember.

Objected to, by counsel for plaintiff.

A. If my recollection serves me right it was an exceedingly dry season, and the stream was very dry.

46.—46 Q. What time was the overflows in the fore bays in the bear-trap dams nailed up, if you remember?

A. I believe it was in December, 1887.

489 47.—47 Q. You can state whether or not to your knowledge any overflows have been used on any of the dams since that time.

A. I have not used any overflows on the dams that I know of since that time.

48.—48 Q. The dams only being used as splash-dams to create artificial floods on unnavigable streams, and being built and used for driving logs, how are they intended to be kept, and how are they kept, as far as you know, when not actually used to raise splash-floods to float logs?

A. When not in use they are intended to be kept down, and I believe they are so used.

49.—49 Q. How are they kept after the log-driving season is over; during the winter as you understand it?

A. They remain down.

50.—50 Q. State what means has been taken or used to fasten the levers which operate the wickets in order to prevent any interferences of these dams by any unauthorized persons?

A. They are locked, or fastened with a chain or padlock.

51.—51 Q. Who has the control of these keys until they are deposited in the office?

Objected to, by counsel for complainant.

A. The keys are in charge of the foreman of the creekmen.

52.—52 Q. State whether you are acquainted with the manner in which the men spend their time, that is, of the creekmen, and in driving logs, what proportion of the time is spent in controlling and operating the dams?

A. I am acquainted with the way in which they operate the dams and drive the logs, and have observed them very frequently, and of the proportionate time occupied by them in operating the dams. The time spent by them in operating the dams is very small. The bulk of their time is spent between the dams and in the pools sorting the logs.

53.—53 Q. You may state whether any person or persons are or ever have been employed specially to take charge of these dams, either before or after the injunction in this case, that you know of.

490 A. I never employed a man specially to take charge of the dams, nor do I ever remember of any being so employed.

54.—54 Q. You can state whether from experience or observation any such person is needed to specially take charge of these dams or ever was needed to specially take charge of them, either before or after the closing of the overflows?

Objected to, by counsel for complainant.

A. I do not believe that it is at all necessary to have any men employed to take charge specially of the dams now or at any time previous.

55.—You may state whether or not it cost more to take charge of those bear-trap dams which had no overflows, than to take charge of those which had overflows?

Objected to as irrelevant.

A. There is no difference in the cost. I speak of the dams on the Du Bois property.

56.—56 Q. You may state whether it costs any more to take charge of all these bear-trap dams as well with as without overflows, than it does to take charge of other bracket or splash dams, or dams used to raise artificial floods of equal size and used for the same purpose, according to your experience, on the Du Bois property?

Objected to by counsel for complainant as irrelevant.

A. It does not.

57.—57 Q. You may state from your knowledge, whether it has cost more to keep in working order the dams which by decree of court had the lower end of the fore bays closed up since said overflows were closed up than it did before said overflows were closed up.

A. I find no difference in the expenses whatever.

Witness shown map marked Exhibit ——, showing location of dams, etc.

58.—58 Q. Taking the map, as furnishing the number of feet by direct line from the part of the lower dam, extending your line to what is called the Jo Hand dam, by the usual traveled route
491 taken by the men to operate the dams, what distance is it from the lower dam at the bottom of the pool to what is called the Jo Hand dam?

A. It would be a little over a mile.

59.—59 Q. Starting from the plank road leading from the Third ward to what is called the city proper, (that is the city of Du Bois), how far is it from that plank road by the usual path the men travel to the Jo Hand dam, that is, starting at a point on the plank where the path is used by the men crosses said plank road?

A. Without measuring, I would judge it to be about a mile.

60.—60 Q. You may state, the height of the dams being considered and the lowness and swampy character and breadth of the bottoms of the Sandy Lick, what number of feet a flood of natural

water would reach when it would flood out the dams and cover nearly if not all of the bottom lands from the first road running south above the Jo Hand dam to the plank road which runs through and connects the Third ward with the other wards in the city of Du Bois?

A. About six feet.

61.—61 Q. You may state how long you have lived at the city of Du Bois?

A. Almost six years.

62.—62 Q. Now you may state whether you have or have not known of a single case in which there has been so quick a rise and descent of water as did any harm to any of the dams?

A. I do not remember of any such a case occurring.

63.—63 Q. You can state whether you have or have not known of a single case in which an injury has happened to those bear-trap dams on the Du Bois property from a defect in the action of the wickets?

A. I do not.

64.—64 Q. You may state whether you have or have not observed as a fact that after the bear-trap dams have been elevated to their full height, if both upper and lower wicket is closed, that the leaves will continue to remain elevated to their full height?

A. I have.

65.—65 Q. You may state whether you were at an experi-
492 ment during the last summer in which after the dam had been fully raised and was pressing against the stops and the upper wicket was permitted to remain open, and the lower one was half opened, whether the dam did or did not continue to remain elevated and the water in the fore bay was reduced in height below the height of the water in the pool?

A. I was present at the experiment at the Jo Hand dams. The dam remained up with the upper wicket open and the lower one partly closed, the water was lower in the fore bay than in the pool above. This experiment was repeated a number of times. The water was at the top of the gates and running over.

66.—66 Q. You may state whether you observed as a fact (the dams being in working order), that after the leaves of a bear trap had been elevated to their full height, that if both upper and lower wickets of the fore bay were closed, that the leaves of the bear trap remained elevated, but that the water in the fore bay was reduced below the level of the water in the pool above, referring to the dams on and as constructed on the Du Bois property without overflows.

A. I have observed this to be so. I observed this, I think, on four of the dams.

67.—67 Q. You may state what you observed as a fact to be the effect that a float put into the fore bay and so adjusted as to operate the leaves which control the wickets, had of controlling the height of the leaves and of the pressure of the water under them.

Objected to, by counsel for complainant, that the question does

not show that the experiment was during the period of infringement. Further objected to by counsel for complainant, that the respondents in proving the measure of profits and damages, cannot introduce evidence of devices which were only operated successfully after the period of the injunction.

Objection sustained and question rejected.

Defendant offers to prove by this, the witness, John Du Bois, that by the use of a float properly constructed and so arranged as
493 to operate upon levers which regulate the wickets, both the opening and closing of the upper and lower wickets can be so regulated as to control the height and pressure of the water in the fore bay, as well as the height and pressure of the water under the leaves of the bear-trap dam. This offered in connection with patent No 229,682 to John Du Bois, for improvements in dams and locks, granted July 6, 1880, and the specification and application therefor were filed therefor, dated 10th February, 1879. And in connection with Kirk's Exhibit Tracing, U. S. circuit court, W. dist. of Penna., No. 15, May term, 1886. Also offered in connection with question 58 X Q. Arthur Kirk's testimony, taken before the master in this case for the purpose of contradicting said testimony.

Also, for the purpose of contradicting testimony of Mr. Roberts in question and answer No. 18 X Q.

Objected, that the question does not state that such use was known or successfully practiced during the infringement or before the date of the complainant's invention.

Objection sustained and offer rejected.

68.—68 Q. Please state how long these bear-trap dams usually last, so used on the Du Bois property.

A. About six or seven years.

69.—69 Q. Please state as to what is used and what has always been used in connection with the bear-trap dams on the Du Bois property, to prevent the upper leaf from being raised beyond a given height.

A. We use and have used stops placed against the side of the dams.

70.—70 Q. State what effect these stops and the wickets have always had in successfully controlling the elevation of the leaves of the bear-trap dams as built on the Du Bois property without overflows, as far as you know.

A. We have found it sufficient to control the dam.

71.—71 Q. You can state now, whether you have noticed any difference between the controlling effect of the wickets and stops used by you on the Du Bois property, (on the bear-trap dams), when used upon dams without Kirk's alleged devices, or when used on dams having Kirk's alleged device.

494 A. I have noticed no difference whatever in either of the above cases as regards the control of the dams.

Cross-examination.

Examination conducted by W. L. PIERCE, Esq.:

72.—1 X Q. What is the next dam above the Jo Hand dam, and what is the distance from it to the Jo Hand dam, by the nearest practicable path?

A. I can only approximate the distances. I would say about one mile. The dam is known as Shaffer's dam.

73.—2 X Q. The question repeated as to the dam above the Shaffer dam.

A. It is the Kilmer dam. The distance is a mile, more or less.

73.—3 X Q. The question repeated as to the distance between Narrows Creek dam and the nearest dam which was adjudged by the court to have Kirk's device, by any practical path?

A. The distance would be about one-half mile. This would be to the Kilmer dam.

74.—4 X Q. Did the Shaffer dam have what was adjudged by the court to have Kirk's device?

A. To the best of my recollection it had, but I am not positive about it.

75.—5 X Q. What was the situation of the Shaffer dam?

A. It was situated on the Sandy Lick creek on what is known as the Shaffer property.

76.—6 X Q. What is the nearest dam which had what is adjudged as Kirk's invention, to the Tomkeen dam?

A. The Kilmer dam, I believe, is the nearest. The shortest route is about a mile and a half.

77.—7 X Q. Will you explain the change in name and structure of the Chamber of Commerce dam?

A. It was called the Chamber of Commerce dam by some parties, I do not remember by whom, and was known among the men as the Jo Hand dam. It was what some called a twin dam. There were two chutes. The new dam was built a little above and
495 is still called the Jo Hand dam, and one of the old dams was taken out and the other was abandoned. The two old chutes were abandoned.

78.—8 X Q. What wages are paid to the foreman of the crew and the other members of it?

A. The foreman is paid two dollars and twenty-five cents per day, and the men each one dollar and seventy-five cents per day.

79.—9 X Q. This particular crew is hired for what term?

A. They are hired by the day.

80.—10 X Q. What are the names of the crew for the last season?

A. Irwin Horn, Martin Hoover, David Hoover, Edwin Shaffer, and the other man's name I do not remember.

81.—11 X Q. Their time is nearly all employed, is it not, in sorting logs and taking them to their proper places?

A. Their time is almost all occupied during the sawing season in driving and sorting the logs and putting them in their proper places.

83.—13 X Q. During what proportion of the season do you use bear-trap dams for the purpose of raising artificial floods?

A. We use them during the spring and summer, and in the fall.

84.—14 X Q. Is it not comparatively seldom that you have sufficient natural water to make a flood?

A. It is.

85.—15 X Q. Is not the bulk of the forest in the immediate vicinity of the creek cut down?

Question objected to as not cross-examination.

A. The timber is practically cut, but what proportion as compared with the whole I would be unable to state.

86.—16 X Q. Are you not using the railroad more and more each year for the transportation of cut logs, and dispensing, to a certain extent, with water transportation?

Objected to, as incompetent and irrelevant, and not the subject of cross-examination; also, for the reason that the railroad does not run into the Sandy Lick lands.

496 A. I don't believe that we are stocking any more with the railroad now than we did in former years.

87.—17 X Q. Are you using the creek any less than in former years for this purpose?

A. I am not; only of course as the amount of the stock varies from year to year.

88.—18 X Q. When did the season for driving logs begin in the year of 1884, and when did it end?

Objected to.

A. I am unable to answer that question.

89.—19 X Q. Same question repeated as to 1885?

Same objection continued.

A. I am unable to answer.

90.—20 X Q. Same question repeated as to 1886?

Same objection continued.

A. I am unable to answer.

91.—21 X Q. Same question as to 1887?

A. I am unable to answer; that is, give the exact day as to any of the foregoing, or the week or month, as the season varies.

92.—22 X Q. During the customary logging season, are you able to predict any particular time during which the dams will not be needed?

A. I am unable to say.

93.—23 X Q. Am I to understand from your testimony that the dams are never used during the winter season, namely from November to March?

A. Yes, sir; they are never used, generally speaking, during the winter season, but they may be used in November, if the weather permits, and we have a supply of logs.

94.—24 X Q. Can you state approximately, when you hired the crew of five men in 1887, and when they were discharged?

A. Well, no; I could not state near when they were hired or when they were discharged. The time they were employed I believe would be about eight months.

95.—25 X Q. During the years from 1884 to 1887 inclusive,
497 would eight months represent with substantial accuracy the period of employment of the creek men.

Objected to, as incompetent and irrelevant.

A. I think it would be the greatest average time of their employment in driving logs on the creek, and sorting the logs in the pond.

96.—26 X Q. During the period from 1884 to 1887 inclusive, would eight months be substantially a correct average each year for the period that the dams would be liable to be used, that is, the dams in controversy?

Objected to.

A. I believe eight months would be the greatest time that the dams would be in use as an average time. It might be more or it might be less.

97.—27 X Q. To the best of your information and belief, eight months would be an average?

A. I suppose eight months would be an average, but I am only guessing it.

98.—28 X Q. Will you refer to data and give us an answer to the above question with accuracy as far as possible before the hearing is over?

A. We will get it for him.

99.—29 X Q. Can you run 5-feet logs in the Sandy Lick creek without employing dams to raise an artificial height of water?

A. Yes, we can in times of natural floods.

100.—30 X Q. What ones of the seven dams involved in this issue were bulkheaders during the dry seasons of 1884 to 1887 inclusive?

Question objected to as incompetent and irrelevant.

A. The one nearest to the bill mill, and I think the one next to the bank in the mill pond.

101.—31 X Q. What length of time were these two dams bulkheader from 1884 to January, 1887, inclusive?

Same objection continued.

498 102.—32 X Q. Can you give it approximately, with reasonable correctness?

A. I could not approximate it with any degree of accuracy.

103.—33 X Q. Will you, before this hearing is concluded, furnish such data as you may have concerning this matter, and give us your conclusions?

Objected to, for the reason that witness cannot promise under oath what he will do.

A. I will try to ascertain what is required.

104.—34 X Q. Am I to understand from your testimony that the seven dams in controversy are kept flat from November to March?

A. They are usually kept down during the periods above mentioned, but it varies with the seasons. They are used sometimes in November and sometimes in March.

105.—35 X Q. Is it not true that during the logging season that the seven dams in controversy are either actually upright or are so frequently required to be upright that for practicable purposes they may be considered to be continually upright, subject only to the exception of the bulkheader dams referred to in your answer to cross-question 30?

A. The dams are up and down as required by the log-drivers, and I could not say that their use would amount to their being up continually, for some of them are left down for long periods in order to get water below.

106.—36 X Q. Assuming that it is necessary that log dams should have constant manual attention when upright, would not such manual attention during the logging season be practically continuous so far as concerns the hiring and discharging such dam-tenders, owing to the uncertainty and irregularity in the times in raising and lowering the dams? I refer to the time from March to November.

Question objected to, as misleading and so indefinite as not to permit a definite answer; further objected to, because the assumption is not permissible under the facts proven.

A. The assumption being at variance with the manner in which we use the dams, I am unable to answer it.

499 107.—37 X Q. The question repeated, with the request that the witness treat the assumption as a fact, for the purpose of his answer only.

Same objection repeated.

A. My answers, as before, have been confined to facts and I prefer not to answer the question.

108.—38 X Q. Same question repeated.

A. In that case I suppose the employment would have to be paid for by the month.

109.—39 X Q. Is the use of the bear-trap dams referred to in question and answer No. 66 in your testimony, the same use and method of working the dams which you have adopted on the said seven dams since the injunction?

Objected to as obscure, etc.

A. I don't remember of adopting any particular method of operating the dams, they are sometimes operated in that way, that is, by leaving both wickets closed, and sometimes the upper wicket is left opened, and the lower one closed.

110.—40 X Q. How much lower is the water in the fore bay than

the water in the upper pool in the experiment which was referred to in question 66?

A. I think it was in the neighborhood of two feet.

111.—41 X Q. Are any of the seven dams raised now at Du Bois, or were they when you left?

Objected to.

A. I do not recollect.

JOHN E. DU BOIS.

500 RULOFF RULOLFSON, duly sworn, called on behalf of the defendant.

Examined by Hon. Judge JENKS:

I am sixty-six years of age. I am engaged in the lumber business, and have been engaged in this business for forty-six years. I now reside in Strattonville, Clarion Co. Pa.

112.—1 Q. State what has been the extent of your experience in building dams constructed for the purpose of raising artificial floods?

A. About thirty-nine years.

113.—2 Q. State the number of logs you have driven or have had driven by that means?

A. In my own right I have hauled over one hundred million, and for other people probably half as many more.

114.—3 Q. State the universal rule as to the strength with which dams used for that purpose are constructed in all their parts?

Objected to.

A. The universal rule is that men owning and constructing such dams, would under all circumstances secure competent men to build such dams in accordance with the head and sudden rises of water that they should be secure and safe for the purposes for which they are built.

115.—4 Q. State whether all dams built for the purposes and used for the purposes of raising artificial floods are not built with express reference to the pressure of water to be raised by them and to be discharged by them.

So far as this testimony is intended to prove that the respondent's dams by reason of their solid structure did not require a relieving device to guard against excessive pressure, it is made the subject of objection by counsel for plaintiff, as the respondent having used such device is estopped in the law from denying its utility or necessity.

A. Yes, under all circumstances where there are no errors or faulty management.

501 116.—5 Q. You can state whether you ever visited the Du Bois dams on his property?

A. I have visited the Du Bois dams five separate times.

117.—6 Q. You can state what all these bear-trap dams are used and built for, exclusive of the two dams below the mill.

A. From all the surroundings, from the information received legitimately and from my own knowledge of the property, I would answer that they were used for the purpose of raising artificial floods to run logs to the mills.

118.—7 Q. In addition to this, what relation does the two dams below the mill sustain to creating and maintaining a pool below the mills?

A. They are indispensable for the successful operation of the mills, for the reason that the logs could not be handled without an extraordinary amount of team-work or other expenses.

Map Exhibit No. — shown witness.

119.—8 Q. State whether you ever saw the pool raised by the two dams below the pool, at the saw mills?

A. Yes, sir.

120.—9 Q. State the height of water required to be kept in that pool during the sawing season, to enable the men with facility to sort, float and bring the logs to the mills so that they may be taken into the mills to be sawed?

A. Knowing the size of the stock used by Mr. Du Bois, were I in the management I would have made five feet of water in the pool; with ordinary lumbering establishments, I would have made it four feet strong, four feet at the lowest.

121.—10 Q. At what time in the year does the dry season of the year usually commence in that county?

A. We look for dry weather or a shortness of water in May, to be followed by June flood, we then expect it to be dry until Sept., latter part; but more generally until November.

122.—11 Q. In order to raise and hold the necessary amount of water in the pool at the mills on the Du Bois property, what is necessary in the dry season to do in order to hold the pool at sufficient height to conveniently sort, manage and bring the logs to the mill?

502 Objected to for the reason that the answer to the question will not tend to show that the Kirk's device was not used in these dams in the dry season.

A. It is necessary to first close up every aperture, mend and cork up every crack, and thoroughly tighten the same by means of ashes, straw or any other available matter that will prevent the wasting of any water.

123.—12 Q. Under those circumstances during the dry season of the year would it be practicable to use on the two bear-trap dams on the lower side of the mill-dam pool on the Du Bois property, fore bays whose lower end walls were reduced from 8 to nineteen inches below the comb of the bear-trap dams when up, and thus entirely open as overflow for the escape of water?

A. The dam was lowered in the dry season for my benefit. I did not ask it. Men were left in the pool on their logs immovable. I

urged the closing of the gates, which was done, and every part of them was corked tight, there being no overflow; therefore from seeing that fact as, from my general knowledge, I would claim it to be impracticable to use any such device at that season of the year.

124.—13 Q. What effect would the permission of the lowering of the pool have upon the operation of the mills?

A. It would hang them up, suspend operations.

125.—14 Q. About how much water is required to be in the stream to make a good driving flood, the crookedness of the stream, the sluggishness and smallness of the stream considered?

A. Five feet is as near as my judgment would place it.

126.—15 Q. You may state whether logs when they are driven do or do not gorge frequently, and state whether this is not more so particularly in a very crooked and sluggish stream.

A. It is the general rule that logs do jam, catch upon bars, or in the bends or crooked places, and otherwise lodge in bodies until followed up by further process of breaking such jams and reflooding the stream.

127.—16 Q. You may state when such jams occur, whether it is or is — necessary then so to increase the height of the dam,
503 and stop every crack or outflow in said dam in order to raise the water to such height as will lift the bottom logs of the gorge; this is in the dry season?

Objected to as irrelevant and incompetent.

A. I would order men to go immediately to the dam and close up every gate and aperture and raise an extra head of water, and let it off upon the jam as soon as possible.

128.—17 Q. From your knowledge of the height of the land, the crookedness of the streams and its sluggish character, what amount of flood would flood out the dam and run over the bottoms on the Du Bois property?

A. My judgment is that less than six feet would overflow the majority of the bottom lands.

129.—18 Q. In such case, would or would not the back water relieve and prevent all pressure upon the down-stream leaf of the bear-trap dam?

A. During a flood of that character there would be very little pressure anywhere upon any part of the dam or any part connected therewith.

130.—19 Q. Does the creation or permission of an overflow at any point below the top of the leaf of a bear-trap dam when it is fully elevated improve that dam, when used as an instrument to create artificial floods; in other words, does it make the dam any more valuable as an instrument used in raising artificial floods?

Objected to, 1, that the witness has not shown his competency to testify as to bear-trap dams. 2, that the defendant is estopped from denying the absolute inutility of the Kirk device.

The defendant by the question seeks to determine what is the extent of the benefit alleged to have been conferred upon him by

the alleged device of the plaintiff when placed on the dams and exclusively used to raise artificial floods in driving logs, such as those on the Du Bois property.

Objection sustained.

131.—20 Q. When the water in the pool is simply of suffi-
504 cient height to bring the leaves of a bear-trap dam to their full height against the stops, how much higher, if any, is the apex or top of the leaf than the water in the pool?

Objected to, as incompetent and irrelevant.

A. The water will raise the gate as constructed upon the Du Bois property when it is in the neighborhood of 22 to 24 inches below the apex of the leaf, (upper leaf.)

132.—21 Q. Suppose after this, the water continues to rise in the pool until it reaches the top of the leaf, if you close both the upper and lower wickets, will the leaves continue to be elevated at their full height? I speak of the Du Bois dams.

A. There is no perceptible change, the water remains about one-fourth lower in the flume than it is in the dam above.

133.—22 Q. You can state what you observed with reference to the stops as used on the Du Bois dams?

Objected to as irrelevant.

A. I saw there was a stop in the form of a plank secured to the side walls, against which the upper leaf of the dam rose firm and solid.

134.—23 Q. You can state what effect this had automatically in regulating the amount of water going in through the upper leaf and discharging by leakage through the lower leaf?

A. I saw the experiment tried upon the Jo Hand dam; the dam rose of itself to its full height, when the stop would, of course, shut off the water from passing through the upper leaf. It made no material change in the quantity of water in the flume; it remained, as before, away below the upper level.

135.—24 Q. State whether it did or did not equalize the quantity of water going through the upper leaf and going out from the lower leaf?

A. So far as there was any means of judging there was sufficient water passed in to equalize and support the dam; of its exact pressure or balance I had no means of exactly determining.

136.—25 Q. You can state if you know the size of the wickets in the fore bays of the Du Bois dams?

A. I do not know exactly. I got as near to them, that is
505 the lower wicket, as I could get, and measured it. I believe them to be from 20 to 22 inches square.

137.—26 Q. You can state whether or not by the use of the wickets the height of the leaves as well as the pressure of water can be fully and adequately controlled in the bear-trap dam as erected upon the Du Bois property?

Objected to as incompetent and irrelevant.

A. Yes. They can be retained at any place in the dam and be held stationary by the use of the wickets.

138.—27 Q. Please state whether or not by using that ordinary care, which men reasonably careful of their interests ordinarily use, the wickets of a bear-trap dam as used on the Du Bois property furnish an adequate and sufficient means both to control the height of the leaves as well as the pressure of the water under them?

A. I believe that I am able to demonstrate that every principle required or necessary to sustain such dams at their full height, as well as to relieve the pressure from the under leaf is vested in the two wickets by which they are operated.

139.—28 Q. State whether it does or does not require a skilled laborer to manage these wickets and take charge of them?

A. Any ordinary laborer is fully competent to take charge of and manage the same.

140.—30 Q. You may state whether by the use of the wickets by any person who has the usual intelligence of a log-driver, whether these bear-trap dams, as to the elevation of the leaves and the pressure of the water, cannot be more fully controlled than by the use of Kirk's automatic overflow?

A. My answer to that would be, that I found them to be fully controlled by the use of the wickets, and that by actual experiment when the wickets were closed the leaves of the Jo. Hand dam remained at their full height, the water under the lower leaf being about the same height as the overflow which was the so-called, the Kirk overflow; therefore I could see no advantage, no safety accruing to the dam, by the use of the overflow whatever, either at that time, or in that place; therefore it added no safety to the dam or its leaves.

506 141.—31 Q. Can or cannot by the use of the wickets, the height of the leaves or the pressure be controlled by the use of the wickets?

A. The water can be introduced and the leaf raised with the use of the wickets to any point from a level to its highest limit and held there.

142.—32 Q. State whether you have both by long observation and knowledge of what are known as floats?

A. I was born in a lumbering country. In my boyhood days when I could steal from school or get a vacation, I worked around the mills; they used (my mother's people) a grist-mill, and saw-mill in connection; to regulate the water in the grist-mill, they placed a float to control the height of water and to prevent the shutting down of the saw-mill from time to time from causing the grist-mill from running too rapidly; at the age of 20 years I commenced to work and did my first day's work upon a wicket gate; at the end of one month I was given control of a shop, eight workmen and the oversight of fourteen saw-mills; I continued for seven years to build mills, operate them for other men, grist-mills, fishways and other water works of a general character; since that time I have built all my own mills, built my own dams, have made my own drafts, and have always done the finer part of the work with my own hands. I

have made it a rule to visit all improvements that were made or being made, from Maine to Minnesota, and have endeavored to obtain a correct knowledge of them as far as reasonable, and upon this I base my knowledge. I would further state that we use floats to regulate the water in fishways. In short, I saw floats in operation at the Du Bois dams, next above the fair ground, that fully convinced me of their practicability to govern and control with entire safety the leaves of any bear-trap dam made and constructed upon the principle used at Du Bois.

Adjourned, to meet Wednesday, January 9th, at 9.30 a. m.

507 And now, Wednesday, January 9th, 1889, parties met pursuant to adjournment.

Present: W. P. Jenks, Esq. and T. H. Baird Patterson, Esq., for defendant, and W. L. Pierce, Esq. for complainant.

Examination of RULOFF RULOFSON, continued.

Cross-examination.

Examination conducted by W. L. PIERCE, Esq.:

143.—1 X Q. Do you intend to state that the bear-trap dams at Du Bois are constructed of such strength that the hydrostatic pressure under the leaves unrelieved is not dangerous to the leaves?

A. I do.

144.—2 X Q. You flatly contradict the statement under oath made by John Du Bois in the specification filed April 19, 1881, and an exhibit in this case, in which he states as follows: "The objects of the present invention are: first, to prevent the flexible gates or dam sections from being subjected to an excessive or dangerous pressure of water from beneath." Also statement in the same specifications, reading, "Under the construction represented in my previous patents a possibility of the gates being subjected to a dangerous and excessive pressure in the event of the water above the dam attaining an excessive high elevation; in order to avoid this danger I provide——." Also the statement in the same specifications reading, "Thus, it will be seen, undue strain upon the dam is prevented, and the elevation of the same automatically checked at the point desired."

This question objected to, 1, as not a cross-examination; 2d, as impertinent and irrelevant. This question in its present form is intended to get upon the notes of testimony the declaration of John Du Bois, Sr. in a case wherein John E. Du Bois is defendant, and get it in such a way as not to give John E. Du Bois, defendant, an opportunity of cross-examining John Du Bois, Sr. It is in the nature of an attempt to bring into this case in a way utterly repugnant to all legal precedent or rule, declarations of a man
508 now dead. It is a further attempt to put in evidence on cross-examination declarations which in any event, could only be given in rebuttal. We would, therefore, ask the master to rule the question out of order.

Objection overruled.

Counsel for defendant instructs its witness not to answer, only at his option.

Master requests witness to answer question.

A. I have no desire to set up my judgment as against John Du Bois, deceased, or any other mechanic, but testify from the marks on the ground as they appeared to me. I examined the work, that is the iron-work, etc., in the shops in which they were built. I found the Du Bois dams built in or on a sluggish stream, sunk very low down in the same. I found them built with open tops to the flumes and with low-land adjoinders, not higher than the top, if so high, as the wood-work of the dam. The idea I wish to convey there is that the overflow by land is simply immense, the stream wide. I found by actual experiment that the water rose much faster below the dams than above after it flowed over the leaf when raised. I also found that there was only about three-fourths of the pressure upon the lower leaf that would be given were it subjected to a full head of water. I also found that in no case could there be quite two feet of water pass over said leaves until the water would in a measure cease to rise, for the reason of its immense overflow opportunities of land. When the water has risen to the height of the walls it would necessarily fill the flume; the back water would have increased largely and have given relief of pressure from below, so that in no case can I conceive of a situation that could be applied to said dams that would place them in as much jeopardy than they would be during the first foot of rise of water over the leaf. Hence for the reason that in the greater flood, extraordinary ones, almost the entire pressure would be relieved by a continued levelling of the water, thereby protecting the dam and its surroundings; for these reasons, my judgment has led me to believe that no overflow or device in addition to its regular formation is required or is of any substantial use. I also judged the
509 dams to have been built with sufficient strength to make them secure and safe in all possible emergencies.

145.—3 X Q. Will you give me the rule by which I may determine the unrelieved hydrostatic pressure under the leaves of the bear-trap dam like those at Du Bois and tending to burst out the lower leaf under the following circumstances, "the lower leaf of the dam is ten by eighteen feet, and the height of the water in the pool above the dam is two feet higher than the crest of the dam when up"?

Objected to, as in nowise cross-examination, and an attempt to cross-examine to a cross-examination; and further, the condition as so observed, stated that it is not capable in its present mutilated and obscure form of a clear answer.

A. I learned my multiplication table out of a book and what few problems on hydrostatics I was able to work I acquired in the same way. I regard it impossible to give any correct rule by which this question could be answered without a scientific experiment to de-

termine the problem; from what I do know and I have seen done there can. The formation of the Du Bois dam is such that hydrostatically there cannot be placed upon them as much strain or hydrostatic pressure by one fourth as there is in the head of water above; because they have shown their ability to do away with the surplus.

146.—4 X Q. What is the weight of a column of water two feet high on each square inch of the receptacle containing said column?

Objected to, as incompetent and irrelevant and not the subject of cross-examination.

A. I don't remember.

147.—5 X Q. How many square inches would there be in a leaf ten by eighteen feet?

Objected to as incompetent and irrelevant, and not cross-examination.

A. 25,920 square inches.

148.—6 X Q. Suppose a column of water two feet high exerts a pressure of one pound to the square inch, and this surface, 25,920 square inches was exposed to that pressure of a pound to the
510 square inch, what would be the total pressure on the whole of said surface of 25,920 square inches, and answer in the figures required.

Objected to, as incompetent and irrelevant, not the subject of cross-examination.

A. 25,290 pounds.

149.—7 X Q. You state that you have visited the Du Bois dams at five separate times. What was the date of your first visit?

A. I think it was in 1884.

150.—8 X Q. Did you see a float on any of the dams in 1884?

A. No, sir.

151.—9 X Q. What was the date of your next visit to the Du Bois dams?

A. I think it was in 1886.

152.—10 X Q. Did you see a float on any of the Du Bois dams at that time?

A. I did not.

153.—11 X Q. Please give the dates of your three other visits to the Du Bois dams and indicate what one of them you saw the float referred to by you in your testimony?

A. On Sept. 27th, 1888, I first saw the floats. At one time since that I saw the dams. I made a visit also in May, 1887.

154.—12 X Q. Who called your attention to the floats in your visit in 1888?

A. Judge Jenks.

155.—13 X Q. How many were there at that time?

A. There were two floats on one dam.

156.—14 X Q. On what dam were these floats?

A. I am told it was the Jo Hand dam.

15 X Q. What other bear-trap dams than those at Du Bois have you visited?

A. The Carrier and Cline dams on the North fork, near Brookville. I don't remember visiting others. I think I have been there twice. I made a thorough examination of it.

R. RULOFSON.

511 Adjourned to meet at Du Bois, Pa., on Monday, January 28th, at 3 o'clock p. m.

And now, January 28, 1889, parties met at Du Bois pursuant to adjournment.

Present: J. P. Bakewell, Esq., for plaintiff; Judge Jenks and T. H. Baird Patterson, Esq., for defendant.

HERMAN S. MACMINN, called on part of defendant, and duly affirmed.

Direct examination by Judge JENKS:

My profession is that of civil engineer; I have acted in that capacity for nearly twenty-four years.

157.—1 Q. State whether you have made an examination and accurate survey of the pool just above the two lower bear-trap dams on the Du Bois property, for further description, the pool adjoining the mills and below the plank road that passes from the Third ward to the other wards in the city of Du Bois; also, of the Sandy lick up to what is known and called the Jo Hand dam?

A. I have.

158.—2 Q. State whether this is a correct draft made by you of the pool and the stream?

(Exhibit No. — shown witness; — map of storage-pools and dams.)

A. It is a correct draft from accurate survey. The other drawing is a correct tracing of the draft.

159.—2 Q. You correctly marked the distances on the draft?

A. Yes, sir.

Cross-examination by J. P. BAKEWELL, Esq.:

160.—1 X Q. When was the draft or survey made?

A. The survey was made during the last of December, 1888, and the first of January, '89.

161.—2 X Q. (Exhibit No. —, map of storage pools and
512 dams of Du Bois shown witness.) State whether the road to the fair ground crosses the loop in the creek?

A. It does not. It turns to the left.

Redirect:

162.—3 Q. You can state whether the map correctly represents the waters, their location, and the sizes and distances, so far as the same have been put down in figures?

A. Yes, sir; it is an exact reproduction on paper as it is on the ground.

HERMAN S. MacMINN.

JAMES McGHEE duly sworn:

Examined by Judge JENKS:

I am fifty-two years of age.

163.—1 Q. How long have you lived on the banks of the Sandy Lick creek in the county of Jefferson?

A. Twenty-six years or more.

164.—2 Q. How long have you lumbered on the stream?

—. About thirty-five years.

165.—3 Q. State what you operate on that stream, and how.

A. I operate a water-mill for seven years on this stream.

166.—4 Q. State, if you can, where, with reference to the mouth of Fall creek, is the eastern line of the county of Jefferson.

A. The eastern line of the county of Jefferson is about a half a mile west of the mouth of Falls creek.

167.—5 Q. You can state how that stream compares in size and the amount of water discharged with the Sandy Lick creek above it.

A. There is equally as much water, if not more, in the Falls creek, than in the Sandy Lick creek at that point.

168.—6 Q. You can state how far this stream is below the Du Bois mills—that is, Falls creek.

513 A. I cannot exactly tell; I would say about four or five miles, taking the bed of the creek.

169.—7 Q. How far was your mill below the mouth of Falls creek?

A. About twelve miles by the crook of the stream, as we always estimate it.

170.—8 Q. You can state the condition of the water in the Sandy Lick creek below the mouth of Falls creek in the summer seasons?

Objected to, as incompetent and irrelevant, by counsel for plaintiff.

A. The water becomes very low. It becomes very low in the Sandy Lick creek above, also.

171.—9 Q. You can state whether you ever noticed how much the water raised in your dam when there was a bracket of six feet in height raised by Adam Hunt below the mouth of Falls creek.

A. I have at different times. I have cut off brackets there that wouldn't raise the water in our dam over ten inches by holding all the brackets on our dam and not letting over any more water than we could help.

172.—10 Q. You can state how long in the season the waters are very low.

A. From 1887 we have not had water enough to saw more than three months in the summer season. I mean summer and fall. This includes the spring, summer and fall—what we call the running season.

173.—11 Q. You can state what time in the year, commencing

early in the summer and continuing late in the fall, is what is called the dry season?

A. It commences in June and lasts through July, August and September, and sometimes the water keeps low all fall until the stream freezes.

174.—12 Q. What have you noticed in regard to leaks in your dams in the dry seasons and what effects these leaks had?

Objected to by counsel for plaintiff, the McGhee dams not being bear-trap dams.

514 A. I say that we had a three-inch hole bored in the bottom of the flume, and we couldn't raise a head for three or four months; the water discharged all through that hole. There are certain times in the year by holding all the water as tightly as we can, we cannot raise a six-foot head of water.

All the foregoing testimony objected to, as immaterial and incompetent.

It is admitted that the McGhee dam is not a bear-trap dam.

No cross-examination.

JAMES McGHEE.

GEORGE R. VOSBURG duly sworn.

Examined by Judge JENKS:

175.—1 Q. What kind of dams do they use with others on the Du Bois property for the purpose of creating artificial floods?

A. Quite a number of bear-trap dams are used.

176.—2 Q. State what is the sole purpose for which they are used—of all these bear-trap dams that are used above the Du Bois mills or pool?

A. For raising heads for hauling and drawing logs.

177.—3 Q. How long have you had experience as a lumber man?

A. All my business life.

178.—4 Q. With whom have you been engaged the last year of your life, and what is the general nature of your business in relation to the lumber business?

A. I was with Mr. John Du Bois from April, 1866, until his death in 1886, and with Mr. John E. Du Bois, his successor, up to the present time. I have had general charge of Mr. Du Bois' (both of them) lumber operations under their general directions.

179.—5 Q. You can state if you are acquainted with the operation of bear-trap dams.

A. I have frequently witnessed their operation.

515 180.—6 Q. Do you know who used these dams during the log-driving season—on the Du Bois property?

A. They were used by the men employed to drive logs.

181.—7 Q. You can state how these men are employed when driving logs, with reference to sorting and managing logs in the

pool, floating them down stream, and what use they make of the bear-trap dams and other instruments.

A. They are employed, as all other ordinary laborers are, at a price per day during the season. There is one crew, called the creek crew, assigned to that particular work. That work consists in driving the logs from dam to dam as needed during the season. They are furnished with hand spikes and poles and operate the dams. And when they get the logs to the pool above the mill they are sorted by them; the hemlock by themselves, the rough logs by themselves, and the smooth and very large logs also by themselves.

182.—8 Q. You can state what relation the management of the dams, and the raising and discharging of splash floods by them, sustain to the general employment of the creek men.

A. The management and operation of the dams and the raising and discharging of the splash floods is included in the general duties of the creek men, when they are employed.

183.—9 Q. You can state what necessity, if any, there ever has been or is now, for any person to be especially employed to take charge of the bear-trap dams.

A. No person has ever been employed especially to take charge of them other than the creek men.

184.—10 Q. You can state whether the charge they take of them is the same as they take over other instruments used by them, and over other dams not bear-trap dams.

A. I should say that it is of the same nature.

Cross-examination by T. W. BAKEWELL, Esq.:

185.—1 X Q. Are you the same Mr. Vosburg who has already testified in this case, and whose testimony is found on pages 91 & 92 of defendant's paper book?

A. I am.

516 186.—2 X Q. What are the wages of a creek man employed by Mr. Du Bois; and state what the wages have been since Jan'y, 1884, and how they are paid?

A. I find, by consulting the books, that in 1884 the wages paid the creek men were one dollar and sixty-five cents ($1.65) per day for the regular laborers, and two dollars ($2.00) a day for the foreman; since 1884 the foreman has been paid $2.25; for the year 1885 and '86 the men under him were paid $1.65 per day; for 1887 and 1888 the men were paid $1.75 per day, for the reason that they were employed on the creek. They are paid once a month, their wages being computed by the day for actual service.

187.—3 X Q. Do the creek men work together as a crew, or do they work separately in their operations on the creek?

A. Sometimes all together and sometimes separately; generally near together.

GEO. R. VOSBURG.

GEORGE W. EDWARDS duly sworn.

Direct examination by Judge JENKS:

188.—1 Q. State where you reside, your occupation and by whom employed.

A. I reside at Clear Run, Sandy twp., Clearfield Co. I work for John E. Du Bois. My occupation is sorting logs; worked at that for ten years or more at the mills and on the creek. I attend to the dams at the pool, also, during the summer, and also attend to them in the winter season when the creek is open so that we can use them. We have used them a good deal this winter; other winters we drop the gate down and let the water out.

189.—2 Q. State how you raise and keep up the pool at the mills.

A. I raise the gate and put on a bracket below it—that is in case of a dry season where we have not much water; when we have lots of water we do not need the bracket.

517 190.—3 Q. How did you do in the dry season before the overflow was nailed up?

A. The lower part of the overflow, or fore bay, was the lowest. I put the boards at the lower end of the fore bay and then put on a bracket below. The lower end of the fore bay was about twelve (12) or fourteen (14) inches lower than the upper end. Then I took the boards from the upper end and put them on the lower end and then put on a bracket besides.

191.—4 Q. You can state anything you may know that was used to tighten these dams.

A. Yes, sir; we used shingle shavings, manure, hay, and corked up the gates to make them tight so as to hold water. This is in the dry season.

192.—5 Q. You can state the number of years you have pursued this course with regard to the two dams we have been speaking of.

A. I have pursued this course more or less as long as the dams have been there; not myself alone, but the other creek men with me.

193.—6 Q. You may state why it is necessary to do all this?

A. When there is not much water in the creek to give us water to sort the logs and drive them into the mill, we do this in order to keep sufficient water to float them in and out of the bayous of the creek.

194.—7 Q. You can state in relation to the overflows in the lower part of the fore bay whether they had or had not been nailed up before the commencement of sawing season last spring.

A. They were nailed up in 1888; in the spring. I don't remember who nailed them up. Mr. Fuller was with the men who nailed them up. I don't remember the exact date.

195.—8 Q. You can state what power you have got to control the pressure of water, and the height of the leaves of a bear-trap by use of wickets.

A. I can raise the gates a foot, or two feet, and make them stand at that height, or I can raise it up to a foot of its full height

518 and set the wickets and go home, and when I return in the

morning it will be at the same height as I had left it, provided no person meddled with it. I refer to the two dams below the mill. I mean by those gates bear-trap gates.

196.—9 Q. You can state whether you can or cannot do this with what is called the overflow nailed up?

A. I can do it with the overflow nailed up.

Answer and question objected to—being a plan or device originated since the time of the decree of the court.

Cross-examination:

197.—1 X Q. You state that you cork up all leaks and seams of the dam in the dry season, but these leaks of the dam are left open when the water is high. Am I correct in this?

A. Yes, sir; it is not necessary to cork them up when we have lots of water.

198.—2 X Q. In these bear-trap dams how does the height of water in the fore bay compare with the height of the water in the pool above since the overflow was closed up?

A. It compares just exactly. The water in the fore bay is just the same as in the creek. It rises just with the water in the creek.

199.—3 X Q. Does the water in the fore bay remain at the same height as the water in the pool during the time the leaves of the dam are raised?

A. Since the fore bay is nailed up the water raises together and is of the same height above and below. Of course, I never measured it; I don't think there would be an inch difference.

Redirect:

200.—1 Q. How do you use the wickets in getting the dam up and in filling the fore bay?

A. I shut the lower wicket and opened the upper. The water comes in and raises the gates and fills the fore bay.

G. W. EDWARDS.

519 Mr. JOHN E. DUBOIS recalled.

Examined by Judge JENKS:

201.—1 Q. Referring to testimony given Sept. 7, 1888 (examination of Mr. Du Bois by Mr. Bakewell, question 28), witness testifies in answer to this question No. 28, What is your answer?

A. Letters patent No. 36,342 dated Sept. 2, 1862.
" No. 229,682 dated July 6, 1880.
" No. 236,488 dated Jan'y 11, 1881.
" No. 251,771 dated Jan'y 3, 1882.

202.—2 Q. In your testimony on Jan'y 7, 1889, in answer to cross-interrogatory 10, which was, "What are the names of the crew for the last season?" you answered, "Irwin Horn, Martin Hoover, David Hoover, Edwin Shaffer and the other man's name I do not remember;" please state if since your return from Pittsburgh you have made an examination of the names and numbers of the creek

crew, and what was the result, and what, if any, supplemental statement or correction do you wish to make in regard to your former answer?

A. I wish to correct my answer and say that there are six men employed in place of five, as stated in my former answer as to the creek crew. The two additional names being C. C. Brenneman and Abraham Horn.

203.—3 Q. State whether or not the creek crew in the years preceding the last season, back as far as the season of 1884, were equal in number to the crew of last season, or more or less as far as you know.

A. The number has been the same for the period mentioned.

204.—4 Q. Referring to your former examination (cross-question No. 27), state whether you have obtained the date referred to in said cross-question, and state, as accurately as you can, the period above referred to in said cross-question.

A. The only means I have of ascertaining this is by taking from the books the time of starting and closing the big mill for the years stated as follows:

Year 1884 started March 10 and closed Nov. 24.
520 Year 1885 started April 16 and closed Oct. 24.
Year 1886 started June 7 and closed Oct. 30.
Year 1887 started March 4 and closed Nov. 15.

205.—5 Q. Referring to testimony of same date, in answer to cross-question No. 32, you state, "I will try to ascertain what is required," which by referring to the prior question is shown to be the length of time that the two dams at the mill pond were bulkheaded up from 1884 to January, 1887, inclusive; state whether you have tried to ascertain the date called for in said cross-question, and, if so, state what results or conclusions you have arrived at?

A. I have not been able to find any date or any verbal hearsay on the subject, and therefore cannot answer the question.

Counsel for defendant states: This examination of Mr. Du Bois being made under promise, but subject to the objection as made at time of cross-examination.

Cross-examination by T. W. BAKEWELL, Esq.:

206.—1 X Q. Please refer to the claims of the patents which you have named, and state which of them are used in your dams, if any.

Objected to, as involving or requiring the knowledge of an expert, and also for the further reason that the patents are in evidence and speak for themselves.

A. I am not an expert in patent matters, and, therefore, would not be competent to answer the question. I suppose we were using dams that were covered by patent of my uncle.

207.—2 X Q. You do not know in what respect the dams are covered by your uncle's patents, or whether they are covered at all?

If you do know, please state particularly your knowledge on the subject.

Same objection continued.

A. I would not be competent to answer that question. The patents show what they cover. I do not know of my own knowledge whether they are covered by patents or not.

208.—3 X Q. Are not the dams often used, that is, are they
521 not often kept in an elevated position, at times, when the big mill is not running?

A. They are elevated when we are driving logs, which occurs sometimes before the mill starts.

209.—4 X Q. How long before the starts does the log-driving season begin?

A. I could not answer definitely; it varies. I could not tell within what limits.

210.—5 X Q. In 1888 how long before the mill started did the log-driving begin?

A. I do not remember.

211.—6 X Q. From whom or from what source can this information be obtained?

A. There is no record kept of this, and I do not know from whom it could be obtained.

212.—7 X Q. Is it not necessary for the operation of the big mill to begin log-driving some time before the big mill starts?

A. It is.

213.—8 X Q. Can you state how long?

A. I cannot.

JOHN E. DU BOIS.

JOHN HORNER duly sworn.

Direct examination by Judge JENKS:

214.—1 Q. State where you reside.

A. I reside at Du Bois.

215.—2 Q. State what has been your occupation.

A. Superintendent of the saw-mills for John E. Du Bois, and for his uncle before him.

216.—3 Q. State how long that employment has continued.

A. Since April 2, 1877.

217.—4 Q. Do you know about the erection of what are called bracket and bear-trap dams, and what are those bear-trap dams on the Du Bois property erected for in relation to the raising of artificial or splash floods?

522 In so far questions relate to bracket dams, questions objected to.

A. The dams are used for raising splash floods for driving logs.

218.—5 Q. You can state in relation to those bear-trap dams whether you have observed when the lower wicket is closed and the upper one open, and the leaves have thus, by the rise of the stream,

been elevated to their full height against the stops, how much higher, if any, is the apex of the leaves when thus raised than the water in the pool when it is raised high enough to fully elevate the leaves?

A. I should say that it is fully two feet higher and sometimes more.

219.—6 Q. In addition to the use intended and made of the bear-trap dams above the mills, what use are the two bear-trap dams just below the mills applied to with reference to the raising and holding water in the pool adjoining the mill?

A. For keeping a herd of water sufficient to float the logs to the mill and for sorting the logs.

220.—7 Q. Could you tell how deep the water ought to be kept?

A. It ought to be kept in the neighborhood of five feet.

221.—8 Q. You can state what was found necessary with regard to the overflow, or the fact of having the lower end of the fore bay made lower that the upper one—what was found necessary in relation to the manner in which that overflow was required to be used or disposed of?

A. We found it necessary in low water to close the overflow up entirely, in order to keep a sufficient depth of water in the pool to handle the logs. When the water was plenty the boards are taken off to allow the water to escape to protect the banks at each side of the dam.

222.—9 Q. You can state in relation to the lowness of the banks of the stream whether it was necessary to build mud walls or banks to hold the water to confine the water so as to have a sufficient pool.

A. It was necessary to build banks.

523 223.—10 Q. If you recollect of any other thing that may have been done or was done during the low water to retain the water in the pool, you can state what it was, if anything was done, how it was done.

A. We found it necessary to build a dam below the bear-trap gates; we built it by putting upright post and boarding it cross-wise, to entirely close up the opening between the leaf chambers. We call it a bulkhead. It is built in the leaf chamber, and then corked tightly in order to hold the water.

224.—11 Q. You can state as near as you can when what is called the dry season commences and when it ends.

A. For three years past we found it necessary as soon as we started the mills to erect the bulkheads in each of the dams at the mill. Some seasons the spring floods would last longer than others. I would say from the first of May to the first of September would be the dry season.

225.—12 Q. You can state anything in relation to the dry season of the year 1886 and 1887, and anything in relation to the continuous use of the bulkheads during that time.

A. The years 1886 and 1887, to my recollection, were both dry seasons. There was low water during the whole sawing season except occasionally a flood. The bulkheads were used during the whole seasons of these years except when there was a flood; and

also when a splash came into the pool from the upper dams, the bulkhead was taken from one dam, the one next to the mill, for a very short time to sluice through what drift had accumulated in the pool.

226.—13 Q. State generally when the sawing season commences and when it closes.

Objected to as irrelevant to the use of the dams.

A. From the first of April to the first of November.

227.—14 Q. Do you know from your own knowledge how the other dams are generally kept when not used in raising artificial floods for driving logs?

A. In winter they are kept down; also in summer except in low water; in low water, when a splash is passed from the pool
524 of a dam and all the logs are carried through that the splash will carry, the dam is again closed to accumulate water for a future splash.

228.—15 Q. You can state how long you have been a lumberman, and how long you have been conversant with lumbering operations.

A. Since 1856. I have been in the business in three States, New York, Pennsylvania, and Virginia.

229.—16 Q. You can state, from your knowledge as a practical lumberman, as well as from your knowledge obtained from actual observation of the Du Bois bear-trap dams, whether there is any necessity to employ men to specially take charge of the safety of the bear-trap dams on the Du Bois property, as they are constructed and maintained.

Objected to, as the word "specially" renders the question indefinite, and the question is indefinite as to construction, operation and time.

A. There is no necessity. We never have done so.

230.—17 Q. State whether you do so now, since they have been nailed up.

A. We do not.

231.—18 Q. You can further state whether there was a necessity, or ever was a necessity, to employ men specially to take charge of the bear-trap dams that have not or did not have an overflow.

A. Never to my knowledge was there any person employed for this purpose.

232.—19 Q. Question withdrawn.

233.—20 Q. Who does tend to the bear-trap dams during the log-driving season?

A. The men engaged in driving logs.

234.—21 Q. You may state what relation this management has to their general employment as log-drivers.

A. It is part of their work. They manage the dams when they want to use them.

235.—22 Q. You can state what stops are used on these dams, those that you have observed.

A. Stops are secured to the walls of the dam to secure the
525 gates at their proper height to hold a head of water; against which stops the upper leaf rests when elevated.

236.—23 Q. You can state what you may know in relation to the effect that the wickets have, if any, in controlling the pressure of water, and the elevation of the leaves of a bear-trap dam.

All questions relating to the use of wickets, stops, or other devices objected to until it is shown that they were in use, or known, prior to the time of the infringement and decree of the court.

This to be followed by evidence that such use of the wickets was known prior to the alleged infringement.

A. You can control both the pressure of water and the elevation of the leaves of a bear-trap dam by use of the wickets.

237.—24 Q. State whether this use of the wickets in controlling the pressure and height of the leaves of a bear-trap dam on the Du Bois property was or was not known by you prior to the year 1882.

A. It was known by me, and the wickets were used for that purpose at that time.

238.—25 Q. You can state if you have any knowledge of the number of logs driven in the creek since the overflows were closed, that is, 1888, as compared with the years that the bear-trap dams had overflows.

A. I don't remember a year when there were more logs driven than in the year 1888.

239.—26 Q. State whether or not you know the number of men that constitute the creek crew for this year, that is, for 1888, since the overflows were nailed up; and state whether or not, if you know, what the expense was as compared with former years when there was an overflow in driving logs.

A. I know the number of men that constituted the creek crew. There are six men in the crew. I know the expense was less in driving logs for 1888 than in former years.

240.—27 Q. Do you know when the overflows were nailed up permanently on the bear-trap dams—that is, about what time?

526 A. I remember very well, but cannot give the date. It was right after the decree of the court in this case. It was before the logging season of 1888 commenced.

241.—28 Q. Do you know whether or not the creek crew was greater or less during the logging season prior to the nailing up of the overflows, than the season of 1888 since they were nailed up?

A. The creek crew was no greater. It has been the same for several years—six men.

JOHN HORNER.

Cross-examination by T. W. BAKEWELL, Esq.:

242.—1 X Q. Are you the same Mr. Horner who testified in this case and whose testimony is found on pages 27 and 28 of defendant's paper book?

A. I am.

243.—2 X Q. How long before the starting of the big mill in each year since 1883 to the present time has the log-driving commenced?

A. I could not say that definitely; it varies with each year. I would say the average would be from the middle to the last of March. From two to four weeks the driving season begins, I would say.

244.—3 X Q. In answer to question No. 12 you speak of the use of bulkheads on the dams near the mill, and you say the bulkheads are removed in times of plenty water, or when a splash comes from the pools from the upper dam; how long would the bulkhead remain off after a splash?

A. That would depend upon the amount of water in the splash, usually long enough to pass the drift through the dam that had accumulated in the pool.

245.—4 X Q. Do not these bulkheads have to be removed to pass logs belonging to people below the mill?

A. The bulk of the logs passed through the dam belonging to people below us are passed through in spring before the bulkheads are put on. For three years past we have found it necessary
527 to put the bulkheads on as the sawing season starts—that is, we put the bulkhead on the dams at the mill. We keep them on during the sawing season, except when there is a flood or a heavy splash comes in the pool.

246.—5 X Q. From what time do you date the sawing season?

A. From the time the big mill commences. In 1888 we began on April 4th.

247.—6 X Q. Please state in the aggregate, during the years 1886 and 1887 in the sawing seasons how long were the bulkheads of the dams at the mill off.

A. I could not state the time. It was very little of the time. They were practically on during the whole season.

248.—7 X Q. How often in the years 1886 and 1887 did you have to remove the bulkheads of these dams for the purpose named?

A. Sometimes in the season two or three times a week. In the dry season sometimes they were not removed for four or five weeks at a time.

249.—8 X Q. You say that it is necessary in order to manage the dams properly to prevent a waste of water during the dry season; for this purpose, are the embankments or abutments at the side of the dam made water-tight, and so high that the water will not run over them?

A. It is necessary in order to keep a head of water in the pool sufficient to float the *the* logs, to put in these bulkheads and keep them absolutely tight. It is also necessary to have the embankments absolutely tight.

250.—9 X Q. The embankments are kept higher than the crest of the dam?

A. Yes, sir.

251.—10 X Q. What would be the effect of lowering the top of the embankment, say, two feet below the crest of the dam?

A. It would allow the water to flow over. It would waste the water and wash out the embankment.

252.—11 X Q. It would be practically impossible to use such a dam for logging purposes on the Sandy lick, that is, were the embankment and the bank of the creek two feet lower than
528 the crest of the dam when raised, so that the water would run over the embankment?

A. If there is water enough in the creek to float logs, it could be used for floating logs.

253.—12 X Q. Of what are the embankments immediately adjacent to the schute constructed?

A. Constructed of earth.

254.—13 X Q. Do the embankments on the Sandy creek require frequent renewal?

A. They require frequent repairs.

Objected to as incompetent and irrelevant.

255.—14 X Q. There are less logs driven through the Sandy lick now than formerly, are there not?

A. There is not. It has been about the same for the past six years. There were more brought down this last year on the creek than formerly.

256.—15 X Q. Have you anything particularly to do with any of the dams except those at the saw-mill?

A. I will say that the log-drivers are under my own charge, and if the dams needed any attention that they would not give them, the fact would be reported to me for my action.

257.—16 X Q. Do you take any active part in the management of the dams except those at the mill, or are your duties merely those of superintendent of the dams?

A. Not farther than stated in the previous answer.

258.—17 X Q. How often in the winter seasons, previous to 1887, were the bear-trap dams elevated?

A. Very rarely. I could not say they were ever elevated. They were usually down. I speak of all the dams.

Redirect:

259.—1 Q. I believe you have stated in your testimony that the log-driving commences from two to four weeks before the starting of the big mill; now state whether the log-driving during that part of the season is or is not generally carried on on the natural water of the stream.

A. It is; that is why log-driving varies.

529 260.—2 Q. When you speak of log-driving being carried on by natural water, what is usually the situation of the bear-trap dams as to the elevation of the leaves during that part of the season and when they are driving on natural water?

A. The leaves of the bear-trap dams are down usually. At the very heads of the streams, or as far up as they attempt to float logs, they build a large dam. The logs are thrown into that dam as they are brought from the woods, and the dam is allowed to fill with

water to force those logs down the stream. The bear-trap dams on the main stream are usually down when driving logs in the spring. The dams at the mill are up unless it is necessary to lower them to get rid of too much water.

JOHN HORNER.

HIRAM WOODWARD duly sworn.

Examined by Judge JENKS:

261.—1 Q. State w-ere you now live.
A. Penfield, Clearfield Co., Pa.
262.—2 Q. State w-ere you came from.
A. I came from Luzerne county, on the Lehigh river.

All testimony relating to bear-trap locks on the Lehigh river objected to as incompetent and irrelevant, by counsel for complainant.

263.—3 Q. State whether you are acquainted with what is called here bear-trap dams.
A. I am.
264.—4 Q. State when you first became acquainted with bear-trap dams on Tobahana and Lehigh rivers.
A. About 1845 was the time I became acquainted with bear-trap dams. This is on the Lehigh. I also know the bear-trap dams on the streams in this part of the country.
265.—5 Q. You can state how you obtained a knowledge of those bear-trap dams on the Lehigh.
530 A. I used to tend them and was there when some of them were built.
266.— 6 Q. How long did you tend them?
A. About ten years.
267.—7 Q. State how the leaves were constructed in relation to stops, if any such things as stops were used.
A. There were stops on the sides of the guard walls and protecting the top leaf; also beneath the upper leaf and above the lower leaf.
268.—8 Q. State when elevated how high the leaves reached with regard to the abutments or the breast of the dam.
A. The top of the leaf when up was above the overflow of the dam about eighteen inches.
269.—9 Q. You can state about their power—the strength of the leaves.
A. They were always right; they would stay there under all circumstances.
270.—10 Q. You can state what event, if any, you have noticed with regard to their strength.
A. I have seen them stand elevated under very heavy waters, and under ice floods running over the breast of the dam and the top of the gates from four to six feet high. The reason I know this there was a very heavy flood in the river and heavy ice gorge, and when the ice went out there was a little village at Fort Jenkins; when these ice floods went out there it generally drowned the vil-

lage out. My father was afraid that the ice would remain there till night and then go. My father had a man to go and hoist the bear-trap gates, in order that the ice would move out of the dam before night. The gates stood under that pressure and while the ice went out over the gates and abutments. There was a heavy flow of water right over the *the* gates.

271.—11 Q. You can state how broad the stream was and what was the violence of the water.

A. The stream was very rapid, and was about, at that point, seven or eight or nine hundred feet wide.

272.—12 Q. You can state what you know by actual experi-
531 ment and observation as to the wickets and their use in operating the leaves of the dam.

All testimony relat*ed* — the old and well-known use of wickets used in locks and dams objected to, as incompetent and irrelevant.

A. I know that the wickets would control the leaves of the bear-trap. You could lower or raise them as you desired, or stop them at any point.

273.—13 Q. State the circumstances by which you became acquainted with their use.

A. We used to experiment on them. We would fish there and set fish-nets, and in order to drive the fish out of the deep water we would let water run over the dam and get water to run through the schute. That was the way we found that we could perfectly control the gates of the wickets.

274.—14 Q. You can state whether they would or would not remain at the point you had fixed them by the use of the wickets?

A. They would.

275.—15 Q. You can state what has been your principal calling through life.

A. I have been a lumberman all my life.

276.—16 Q. State how long you were a lumberman on the Lehigh river and when you commenced.

A. I lumbered on the Lehigh seven years for myself. I lumbered for my father ever since I was fourteen years on the same stream—up to 1854. I am now sixty-two years of age. Since that time I have lumbered in this region.

277.—17 Q. How far back can you remember of these Lehigh bear-traps?

A. From 1840 or 1844—along that about that time.

278.—18 Q. You can state whether there is or is not any necessity for a person to specially take charge of these bear-trap dams.

A. It is necessary to have some person take charge of them when you are using them—when you are raising and lowering them.

532 279.—19 Q. State if there is any necessity for any person to take charge of them for any other purpose.

A. It is not necessary for a man to take charge of them to watch them at the time they are not using them. I have known them to stand with the gates up all winter, and no person paying any attention to them, and I have known them to remain down all winter.

280.—20 Q. You may state if you ever took note of the dams on the Du Bois property.

Objected to as incompetent and irrelevant, the size of the locks or schutes on the Lehigh not being taken into consideration with the size of the Du Bois dams, as compared with the breadth of the stream.

280½.—20½ Q. You may state how the volume of the water in the Lehigh compares with the volume of water in the Sandy creek.

A. The Lehigh is a large and rapid stream, and the Sandy creek is a small and sluggish one.

281.—21 Q. What wickets did you turn when you wanted to raise the leaves of the dams on the Lehigh?

A. We opened the upper and closed the lower ones.

282.—22 Q. What wickets did you turn when you wanted to lower the gates?

A. We opened the lower and closed the upper.

283.—23 Q. Have you examined any of the bear-trap dams on the Du Bois property?

A. I have.

284.—24 Q. What wickets do they open when they wish to raise the gates on the Du Bois property?

A. You open the upper and close the lower wicket.

285.—25 Q. What wicket do you open and what do you close when you wish to let down the leaves of these dams?

A. They close the upper and open the lower.

286.—26 Q. What were these dams you speak of on the Lehigh used for with reference to floating rafts and driving logs?

A. Nothing else—except we used them for catching fish.

533 Cross-examination.

Cross-examination by J. P. BAKEWELL, Esq.:

287.—1 X Q. State whether or not you are acquainted with the bear-trap dam known as the Caledonian dam?

Objected to by counsel for defendant.

A. I am; I have been on it. I never tended on it; I do not know what has become of it. It still stands there, I think; it was there last fall.

288.—2 X Q. Do you know whether or not this dam was ever injured by a flood?

Same objection.

A. I don't know that it was ever injured, of my own knowledge.

289.—3 X Q. You have stated that the Lehigh river at the point where the Pine Forest dam was situated was between seven and nine hundred feet in width, and in your former testimony you have stated that the chute was twenty-two or twenty-three feet wide; there was a far greater amount of water against the dam than against the leaves of the chute or lock, was there not?

A. Yes, of course there would be more pressure on the dam than on the lock or chute.

290.—4 X Q. Is the Pine Forest dam still standing?

A. It was the last time I saw it.

291.—5 X Q. The bear-trap portion of the Pine Forest dam was confined to the chute or lock, was it?

A. Yes.

HIRAM WOODWARD.

WILLIAM WOODWARD duly sworn.

Direct examination by Judge JENKS:

I reside at Penfield, Clearfield Co. I came formerly from Luzerne county, on the Lehigh.

292.—1 Q. You can state whether you know of the exist-
534 ence of what are called here bear-trap dams—on the Lehigh river.

A. I was acquainted with one bear-trap dam on the Lehigh river. It was one called No. 3 or Pine Forest dam.

293.—State how such dam was constructed, with relation to stops, if there were such things as stops on the dam.

A. Above the upper leaf there were timbers bolted on the side, the side walls of the dam, and at the lower leaf there were some kind of catches there. I never examined, but I know they stopped the gate when it reached a certain distance. This was underneath the upper leaf.

294.—3 Q. You can state when the leaves were fully elevated by the opening of the upper wicket and the closing of the lower one, what its height was in reference to the breast of the dam.

A. I should say the leaves were about fifteen (15) to twenty (20) inches above the breast of the dam.

295.—4 Q. You can state what you know in regard to the strength or sufficiency of this dam to stand against pressure.

A. Well, I know it stood against a great many ice floods and they never seemed to effect it any.

296.—5 Q. You can state as to the sufficiency of the wickets to control the gates at any height.

A. You could control the gates at any height desired by the use of the wickets.

297.—6 Q. You may state how many years you were on the Lehigh river and observed the operation of this dam.

A. I left the Lehigh in 1859. I was raised there and always lived there until that time. I am now sixty years of age.

298.—7 Q. You may state from your knowledge obtained by actual observation whether there was or was not any necessity for any person to take charge of the dam you speak of when not in actual use.

A. I don't think there was.

299.—8 Q. You may state what attention was given to it when it was actually used.

A. Nothing more that to go to the dam and raise and lower it.

535 Cross-examination by J. P. BAKEWELL, Esq.:

300.—1 X Q. Are not the banks, or rather the ground, on each side of the upper Lehigh high and rocky?

A. Some places it is very rocky, but in other places there were flats.

301.—2 X Q. According to its general character, does not the upper part of the Lehigh flow between ground having hills on each side?

A. Yes, sir.

WM. D. WOODWARD, SR.

PETER EVANS, duly sworn.

Direct examination by Judge JENKS:

I now reside at Penfield, Clearfield Co. I came from Luzerne Co., Lehigh river. I came from there in 1859 or 1860.

302.—1 Q. Did you ever see what is called here a bear-trap dam—at the Lehigh river?

A. Yes, sir.

303.—2 Q. State where the dam was.

A. It was at a place called Pine Forest.

304.—3 Q. State how it was constructed with reference to stops on the leaf chamber, if any such stops were used.

A. There were timbers bolted on the sides of the guard wall, and the gate would strike against them when rising up, that is the upper gate. The timbers were nailed on both side walls.

305.—4 Q. State, if you remember, whether there were or were not other stops.

A. I don't know about the lower gate. I thought it stopped against the upper gate. There was a piece of timber on the under side of the upper gates, against which the under leaf would strike.

306.—5 Q. State what effect this had upon the lower gate.

A. It stopped them there and the gates would rise no higher.

536 307.—6 Q. State when the leaves of the dam were fully elevated by the use of the wickets, what the height of the leaf or leaves were as compared with the height of the breast of the dam.

A. They were higher, but I could not say how much higher.

308.—7 Q. What was found to be sufficiency of this dam to resist pressure; what was its strength?

A. Its strength was strong enough to stand anything that came there. There were heavy floods of ice and water came against it. At one time a heavy flood of ice came when the gates were up. It had no effect on the dam. I mean that the flood had no effect on the dam or leaves.

309.—8 Q. Could the leaves be controlled at any height by the use of the wickets?

A. Yes, sir; they could.

9 Q. You can state whether the dam did or did not require any person to take charge of it when not actually used in floating lumber or driving logs.

A. No, sir. There never was any one there to take charge of the dams except to raise and lower them. The lumbermen opened the gates themselves.

310.—10 Q. Please tell the character of the stream, as to its size, and the volume of water discharged, rapidity of its current, straightness of the stream and size of the flood.

A. It is quite a large stream, very rapid, discharges a good deal of water, because it runs between two mountains; very crooked and rough and has very large floods.

311.—11 Q. How long were you on the river?

A. I was there from the time I could remember anything until 1859. I am now fifty-nine years of age.

Cross-examination:

312.—1 X Q. In your testimony in another suit you have stated in regard to this dam that you do not recollect of ever having seen the water flow over the top or comb of the leaves of the bear trap. Is this correct?

A. I do not remember seeing it run over the leaves of the
537 bear trap, but have seen it run over the dam very much. The gates were on the other side of the river from w-ere I lived, and in the big floods I would not get them.

313.—2 X Q. Then you had no opportunity of examining the gates when the flood arose?

A. No, sir.

314.—3 X Q. How long did the rafting season continue—during what months did it last?

A. They ran pretty much all summer. They did the summer that I attended the gates.

315.—4 X Q. If I understood you correctly, you were employed to raise the gates so as to obtain a flood of water, and that the raftman, yourself, or somebody else, would lower the gates so as to allow the raft to pass through the lock or chute, after which you would come back and raise the gates in time sufficient to make a flood for the next raft or lot of lumber expectant; is this correct?

A. Yes, sir.

316.—5 X Q. Then, as a rule, the gates or leaves would remain lowered until you raised them. Is this so?

A. Sometimes the raftsmen in going back would raise them and then I would not have to do it.

317.—6 X Q. Was this the rule or the exception?

A. I raised the gates the most, oftener than the raftsmen.

328.—7 X Q. When you raised the gates to get a head of water, did you raise them to their full height?

A. Yes, sir.

Redirect:

319.—1 Q. How soon after the rafts went through, as a general rule, would the bear-trap gates again be put up?

A. I do not think it would be more than two hours.

Recross-examination:

320.—8 X Q. How long in the rafting season, as a general thing, during the year you attended the lock did it take to get a head of water in the dam sufficient to permit the water to flow over the comb of the dam?

538 A. I don't think it would take more than a couple of hours. If the water was low it would take longer.

321.—9 X Q. During the busy part of the rafting season rafts and lumber were coming down pretty constantly, were they not?

A. They ran one set of rafts every day; that was all.

322.—10 X Q. How many were in a set?

A. That is more than I can say; sometimes more and sometimes less.

his
PETER x EVANS.
mark.

CHARLES ROBACKER, duly sworn.

Examined by Judge JENKS:

323.—1 Q. State where you now live.

A. I live near Penfield, Hudson t'w'p, Clearfield Co.

324.—2 Q. From what part of the State did you come from?

A. I came from the Lehigh river—from that section.

325.—3 Q. How long were you on this stream?

A. I was on that stream about five years. I did different kinds of work there; run rafts down the river for several seasons while I was there.

326.—4 Q. Did you ever see what is called a bear-trap dam on the Lehigh?

A. Yes, sir.

327.—5 Q. Can you state how, if you know, the leaves were constructed with reference to stops, if any such things as stops were used?

A. The leaves were stopped by timbers on the inner side of the walls of the chute. The under leaf was also stopped in the same manner. On the under side of the upper leaf there was a timber against which the upper end of the lower leaf would rise, in order to keep it from bursting out. There were three dams on the Lehigh that I was acquainted with. I became first acquainted with them in 1851.

539 328.—6 Q. You can state what effect these stops had upon the leaves of the dam.

A. They had the effect to stop the leaves, so that they could not break out.

329.—7 Q. You can state how you have seen their strength tested, if you ever have.

A. I know of their being heavy ice floods on the river, but was not at the dams at the time, so I could see them. I knew they were not injured.

330.—8 Q. State as to the sufficiency of the strength of these dams.

A. There were none of them gave way while I was in that section of the country.

331.—9 Q. You can state how high the apex of the leaves rose above the breast of the dam.

A. About eighteen (18) inches. The reason I know this is by seeing the top of the gate while I was up on the dam about eighty (80) rods, and the water was pouring over the breast of the dam, and I saw the top of the leaves about a foot or more and the water was not pouring over them. I could see them plainly.

332.—10 Q. You operated the dams—that is, raising and lowering the leaves by means of wickets?

A. The dams were operated in the same manner as stated by Mr. Woodward in his testimony.

333.—11 Q. You may state, if you know, about what control the wickets gave over the elevation and depression of the leaves of the dam.

A. We could control the gates by the use of the wickets; could fix them at heights desired.

334.—12 Q. You can state whether there was or was not a necessity for any person to take charge of those dams when they were not actually used in lumbering.

A. No, sir, there was no necessity; never was any one there to take charge of them. Frequently only the men on the rafts would operate them. They would jump off the rafts and run down to the dam and open them, and get on as the raft came down.

540 335.—13 Q. State whether or not this last answer applies to the bear-trap gates when fixed at various heights below their full height by the control of the wickets.

A. Well, we never used them at various heights. We always had them at full height, or else down. We did not use them at intermediate heights for rafting.

336.—14 Q. Do you know the character of the Sandy Lick creek?

A. I do.

337.—15 Q. State how it is as to the amount of water running in it as compared to the amount of water running in the Lehigh river.

A. The Lehigh river is much larger, strong and rapid. The Sandy lick is sluggish, narrow, low banks, crooked.

338.—1 X Q. What were the names of the three dams you speak of on the Lehigh?

A. They were numbered; their numbers were 1, 2 and 3.

339.—2 X Q. Were they in the lower or upper part of the river?

A. In the upper.

340.—3 X Q. About how wide was the river at these dams?

A. At the upper dam the river was about—I can't state the exact width; I think the upper one was not more than three or four hundred feet; at No. 2, the river was about five or six hundred feet wide; at No. 3 perhaps seven or eight hundred feet. No. 3 is the Pine Forest dam.

341.—4 X Q. How wide were the locks or chutes of these dams which were provided with bear-trap dams?

A. I should judge somewhere from eighteen to twenty-two feet. I never measured them. I think Pine Forest dam was wider than the others.

342.—5 X Q. Then there was a greater pressure or amount of water on the dam itself than on the leaves of the lock or chute, the dam portion or breast of the dam being about twenty-five times greater in area than the leaves of the bear-trap lock?

A. The pressure is, of course, equal on the gates that it is to the same space on the dam, and I think more so, because the
541 water flowed over the breast of the dam and not over the gate.

343.—6 X Q. Would there be more pressure on the upper or lower leaf of the bear trap in the locks, in your opinion?

A. My impression is that the pressure would be greatest on the under leaf.

344.—7 X Q. Are dams 1, 2 and 3 still standing?

A. I do not know. They were still standing when I left. I left there in 1858.

345.—8 X Q. Have you ever worked on bear-trap dams other than those on the Lehigh?

A. No, sir.

CHAS. ROBACKER.

C. F. FULLER, duly sworn.

Examined by Judge JENKS:

346.—1 Q. State where you reside.

A. In Du Bois.

347.—2 Q. By whom are you employed?

A. By John E. Du Bois.

348.—3 Q. By whom were you employed previous to the death of John Du Bois?

A. By John Du Bois, Sr.

349.—4 Q. State how long have you been in the employ of both Mr. John Du Bois and John E. Du Bois?

A. I came here in the spring of 1877, and was in the employ of John E. Du Bois from that time until his death, and in the employ of John E. Du Bois since the death of John Du Bois.

350.—5 Q. State what is the nature of your employment generally.

A. I am what you might call an overseer of his business outside the office.

351.—6 Q. State what relation you have and do sustain to the erection of his dams built to raise artificial floods to drive logs.

A. I have overseen the building of his dams.

542 352.—7 Q. State what relation you have sustained to the building and repair of what are called his bear-trap dams?

A. Just the same. I have full control of their building.

353.—8 Q. State how long these bear-trap dams usually last?

A. Six or seven years.

354.—9 Q. You can state what has been your usual practice in the

fall of the year as to repairing the dams so as to fit them for the next season's use?

A. We repair them every fall; all dams that need any repair for use of driving next season.

355.—10 Q. You can state whether you have had an opportunity to obtain a full knowledge of their operations?

A. I have.

356.—11 Q. Can you tell what the size of the wickets is?

A. Eighteen by twenty inches. That is the river wickets.

357.—12 Q. You can state when the wicket of the lower end of the fore bay is closed and the wicket of the upper end of the fore bay is opened, what effect it has upon the leaves of the bear trap of elevating them?

A. It raises the leaves.

358.—13 Q. You can state what effect after the leaves are thus raised, the closing of the upper and opening of the lower wicket has in depressing the leaves.

A. The leaves of the dam will go down.

359.—14 Q. You can state what you have observed to be the fact in relation to the leaves of the bear-trap dams on the Du Bois property when the amount of water flowing into the chamber and under the leaves is greater than the amount passing out from under the leaves?

A. If there is a greater amount of water passing in them than what is passing out, the leaves will rise.

360.—15 Q. What have you observed with regard to these dams on the Du Bois property after the leaves have been raised, if the amount of water passing from above under them is less than the amount of water passing out from under the leaves, what effect has this upon the leaves of the dam?

A. If the amount of water passing in is less than the amount passing out, the leaves will go down.

543 361.—16 Q. You can state what you have observed to be the general fact with regard to these dams that where, after having been raised, the water going in to the chamber beneath the leaves, is greater or equal to the water passing out beneath them, what will the leaves do then?

A. They will stand stationary against the stops.

362.—17 Q. What have been the stops used on the Du Bois dam?

A. They are (the side stops,) oak timbers, 4x6 in., bolted to the side walls of the dam or leaf chamber, above the upper leaf, the upper part of the timber being beveled to permit the logs passing over them to glance off.

363.—18 Q. You can — whether you were present at a number of observations made on the Du Bois dams, during the summer of 1888, which, after the dams observed had been fully raised by the use of the wickets, then the upper and lower wickets were fully closed, how the leaves of the bear trap were controlled?

Objected to, as relating to experiments subject to the infringement.

A. The leaves of the dam stood against the stops.

364.—19 Q. You may state whether or not you observed the same fact, with reference to the operations of the bear traps, previous to the time of the commencement of the infringement in this case.

A. We could always control the dams by the wickets. I have observed the same fact as stated in question No. 18. Direct, as above, in dams that were in proper working order prior to the time of the alleged infringement.

365.—20 Q. State, Mr. Fuller, what you have observed as a fact, prior to and ever since the infringement, relative to the power of controlling of the pressure and elevation of the leaves by the use of the wickets?

A. We could control the dam by means of the wickets—that is the pressure and elevation.

366.—21 Q. You can state how long the side stops referred to in question No. 17, have been used.

544 A. They have been used since the first bear-trap dams built on the Du Bois property about 1879 I think.

367.—22 Q. What effect had these stops in controlling the upward movement of the leaves?

A. They stopped the leaves from coming above a given height.

368.—23 Q. You can state whether there were any devices used that acted as stops on the lower leaf to prevent the lower from being forced from beneath the upper leaf.

A. I never knew but one dam that had side stops on the lower leaf on the Du Bois property. That was dam No. 8. We have an iron beneath the upper end of the upper leaf; that is generally, three by one-half inch, some are ¾ inch. The lower leaf generally comes up against this; this helps to stop it.

369.—24 Q. What have you observed in relation to the height of the apex of the leaves when fully raised and pressing against the stops as compared with the height of the water in the pool above, the lower wicket having been closed the upper one opened so — to let the water enter in beneath the leaves, the pool above rising and flowing through the upper wicket beneath the bear trap, when the water has raised in the pool above to sufficient height to raise the leaves to their full height against the stops.

A. The leaves of the dam generally carry or raise two foot above the water in the pool. This would be where the pool had been drained before we started to raise the gates.

370.—25 Q. You can state what effect this height of water has in holding up firmly the leaves of the bear trap.

A. It will hold them firmly against the stops.

371.—26 Q. State what you have done yourself and have observed to have been done with the bear-trap dams from the time the log-driving season closes in the fall to the time it commences in the spring.

A. We repair the dams if anything is wrong with them, always make an examination of them, and let them down. They always lay flat during the winter. There have been cases where by negligence the dams have been left up.

545 372.—28 Q. You may state the object in erecting those bear-trap dams that are above the mill.

A. They are made to raise artificial floods and to drive logs to the mill.

373.—29 Q. In addition to this general purpose, what are the two bear trap- below the mills used for?

A. To create a pool for corting and running the logs into the jack-slips to be taken into the mill.

374.—30 Q. In order to make them efficient for this purpose during the time the water is low in the Sandy creek what is done with reference to the lower end of the fore bays in said dams?

A. They are kept closed higher than the pool in the dam.

375.—31 Q. How does this dispose with the overflow?

A. It closes it up entirely.

376.—32 Q. State whether anything further is required to be done.

A. We put a bulkhead across below the lower leaf of the dams.

377.—33 Q. How do you often manage this?

A. We cork it up as tight as possible.

378.—34 Q. You can state if you know how high or deep the water ought to be maintained in the pool.

A. We keep the water at two different stages. When the logs are down around the mill, it requires from four to five feet to move logs at the upper end of the dam through different channels we have to raise from a foot to 18 inches higher to float these logs.

379.—35 Q. State what effect, if any, the back water has on what is called the Fair Ground dam, it being the dam next above the mill pool.

A. The effect was such that it would not go down on account of the back water.

380.—36 Q. State what years this effect was seen to be obtained.

A. The dam was built in the fall of 1886. The effect was seen in the seasons of 1887 and 1888. It ran one season while the

546 overflow was in. The effect of the back- was to take off all pressure from the leaves of the dam, except a foot and one-half the dam being 4½ feet and the height of the back water 3 feet.

381.—37 Q. You may state what you observed to be a fact in relation to the manner in which the overflow in such bear traps as had it at the lower end of their respective fore bays were used when the waters in the stream were low, and the dams were used to raise artificial floods to drive logs.

A. We closed the overflows when we wanted to raise a flood or dam of water.

382.—38 Q. Why did you do so?

A. It was closed up to save the water. For during most of the dry season the overflow would take all the water that runs in Sandy creek.

383.—39 Q. State how high it is necessary to raise the pool above the bear-trap dams in order to make a good artificial flood to drive logs.

A. Not less than 5 to 6 feet; ought to have 6 feet. That is what we endeavor to get if we can.

384.—40 Q. How high ought the water to be with reference to apex of the bear-trap leaves when fully elevated to make a good artificial flood to drive logs?

A. The more it runs over the apex of the dam the better. It ought to be the amount of water naturally running in the stream, passing over and running down in order to fill the creek below the dam.

385.—41 Q. You can state whether or not those bear-trap leaves are required to be elevated when there is a good natural flood of water in the stream sufficient to drive logs.

The latter part objected to as indefinite.

A. It requires no use of the dam to drive logs with a natural flow 4 to 5 feet high. In the spring there are times when we never use the dams, natural water running through all the time. We generally do our main driving on the Sandy in that way early in the spring.

386.—42 Q. When by a natural flood the water is about six
547 feet in the bed of the entire stream what effect would this have in flooding out the bear-trap dams?

A. It would flood out a dam that was not higher than six feet. It would flood out all dams on the Du Bois property.

387—43 Q. What danger is there for pressure when the dams are locked out or flooded out?

A. The dams would flip over if it were not for the stops.

388.—44 Q. How high must the water be to run over the bottom?

A. Five to six feet.

389.—45 Q. You may state when the water is high enough to run over the banks below, and the back water is resting on the lower leaf of the dam, what danger is there to the dam?

A. The way we have them fixed there is no danger.

390.—46 Q. You may state what time the overflows to the bear-trap dams were nailed up?

A. The 31st day of December, 1887.

391.—47 Q. You can state whether it was necessary before an overflow was made to any of the bear-trap dams, and since the overflow has been nailed up to employ any person to take special charge and keep any of the dams on the Du Bois property.

A. There is no use for such person and never was, and no person was *was* ever hired for that purpose.

392.—48 Q. You can state whether the overflow in the dams when it existed had any effect upon the manner in which said dams were kept, as compared with the manner in which the bear-trap dams without overflows were kept or attended.

A. There is no difference whatever. No more than that we had to shut up the overflow in dry times and low water. The dams that I have built on the Du Bois property are strong enough to resist all pressure that may be brought against them.

393.—49 Q. You can state whether during the years that the bear

traps have been used and built on the Du Bois property you have been connected with this building.

A. Pretty much all of them. I think there was only one bear trap built that I did not have a hand in.

548 394.—50 Q. You can state even in case the lower leaf was swept from beneath the upper one, what it cost to make another and put it in its place.

Objected to, as not a criterion of damages.

A. From twenty-five to thirty dollars.

395.—51 Q. State whether the sweeping of the lower leaf from beneath the upper one could not interfere with the foundation of the dam, on any of the Du Bois dams.

A. It would not interfere with the foundation of any of the Du Bois dams.

396.—52 Q. You can state who constitute what are called the creek crew?

A. There are six of them; have been this last season: Two Hoovers, two Horns, one Brenneman, one Shaffer.

397.—53 Q. State how many men were employed in the creek crew before the overflows were nailed up?

A. The number of creek men were the same.

398.—54 Q. You can sum up, if you know, the general nature of their employment when engaged in driving logs.

A. Their general duty is to drive logs to the mill. They use cant hooks, bear-trap dams.

399.—55 Q. If you know how much of their time is spent in managing the dams as compared with the time spent in driving logs.

A. It is a very small fraction of their time.

400.—56 Q. You may state where the water comes from that passes over the overflow where such a thing as an overflow exists on a bear-trap dam. State its relation to the water in the pool.

Objected to as irrelevant and incompetent.

A. It comes from the pool above.

401.—57 Q. You may state whether such overflow is or is not as to the water in the pool simply a wasteway.

Objected to as incompetent and irrelevant.

A. That is what it is, a wasteway of water.

549 402.—58 Q. State its effect in draining the dam when the water is low.

A. The wasteways or overflow that we had here would drain the water in the pool to the level of the wasteway or overflow a good part of the dry season.

403.—59 Q. You can state what device well known has heretofore been used to discharge the dangerous surplus water and relieve dams from the dangerous surplus and pressure of such water.

Objected to as incompetent and irrelevant.

A. We call these waterways or overflows.

404.—60 Q. State whether there could or could not be made through the embankments running from the side of these dams at very little cost, such a wasteway as would under all reasonable circumstances relieve the entire bear-trap dam from all dangerous pressure?

Objected to, as incompetent and irrelevant.

A. There could be if necessary.

405.—61 Q. You can state what you have observed as a fact concerning the lowness of the breast of what is known as the Dennezette dam, it being a bear-trap dam?

Objected to as irrelevant.

A. I have.

406.—62 Q. State what, if any, use they make of brackets on that dam for increasing the height of the breast of the dam?

Objected to.

A. They put brackets on to raise the water in the dam.

407.—63 Q. What do they do with these brackets when they wish to diminish the height of the water to relieve the pressure of the water upon the leaves of the dam?

A. They take off planks or boards called the bracket boards.

408.—64 Q. You can state whether this diminishes the height of the water in the dam.

A. It does.

409.—65 Q. You can state as a matter of fact what you observed in relation to diminishing the height of water in the fore
550 bay where the upper wicket was left fully opened and the lower wicket half closed, on the Jo Hand dam?

A. It diminishes the water in the fore bay, I don't remember just the number of inches. Under these circumstances the leaves remain stationary.

Counsel for defendant propose to prove by this and other witnesses that a series of experiments during the summer and fall, and perhaps early winter (that is, December) of the year 1888 were made upon what is known as the Kilmer and Jo Hand dams, both of said dams having had at some time during their existence previous to the 31st of December, 1887, at the lower end of their respective fore bays an overflow lower than the side walls and upper end of said fore bay, said overflow being claimed by complain-t as an infringement of his alleged patent, said overflow being regulative in its height, by what are known as adjustible or bracket boards, that the experiments were made for the purpose of ascertaining the true nature of and value of complainant's alleged patent. That in order to be accurate in the experiments the book containing the testimony of complainant in No. 39 of Nov. 2, 1886, being this same case, it being the same book furnished by complainant's attorney, as a copy of complainant's testimony, said book so furnished containing also a copy of the complainant's patent, was taken on the ground and

answer of Arthur Kirk to the X Int. 26, on page 114, and answer on page 115, also that part of his patent found on page VI of the Appendix of said book which refers to the open sluice, water-way or tail race for which he claims a patent, were examined and read, and an opening made under the leaves of the Kilmer dam, in order to determine accurately, by actual experiment, as directed by complainant, "the elevation of water under the dam necessary to support it to the desired height;" and that also the same book from the same page of the testimony, and the same description in the patent were taken to what is known as the Jo Hand dam, and read and examined in order to ascertain and find "the elevation of water under the dam necessary to support it to the desired height;" that
551 following accurately as respondent believes the direction and descriptions given by complainant as contained in said book containing said testimony and patent, an opening was made just under the apex of the Kilmer dam leaves, which showed the height of water and also its elevation in the fore bays which was requisite to maintain the bear-trap leaves at their full height against the stops; it also showed how much lower the water was in the fore bay passing into it through the upper wicket, the lower wicket of the fore bay being closed, than the apex of the leaves when fully elevated; and how much lower the water in the pool of the dam when it was high enough to flow over the top of the leaves when elevated to their full height; also that an opening was made according to the direction of said testimony and patent in the lower end wall of the fore bay of the Jo Hand dam which showed the height of water and also its elevation in the fore bays which was requisite to maintain the bear-trap leaves at their full height against the stops; it also showed how much lower the water was in the fore bay which passed into it through the upper wicket, the lower wicket of the fore bay being closed, than the apex of the leaves when fully elevated; and how much lower the water in the fore bay and under the leaves when said water maintained the leaves at their full height, was, than the water in the pool of the dam when it was high enough to flow over the top of the leaves when elevated to their full height; that said experiments resulted in showing that where the openings or outflows made to correspond with plaintiff's directions in his testimony and as described in his patent, that the discharge of water therefrom would be such as would render his alleged improvement of but little if any practical value to any of the bear-trap dams used and operated by the defendant, in Clearfield county upon the Sandy lick or any of its tributaries, and that the use of said alleged improvement would be of very little if any value to the defendant.

Objected to by counsel for plaintiff, as incompetent and irrelevant.

Objection sustained and testimony excluded.

552 410.—66 Q. You may state when the dry season usually commences and when it ends?

A. Generally commences about the first of June and ends up the

last of September or October. I have known it to be dry all along until winter set in. It was so in 1886. It was dry late in the season of that year. I was building a dam; commenced on Nov. 4. We can't build dams only when the creek is low.

Cross-examination by T. W. BAKEWELL, Esq.:

411.—1 X Q. Referring to your answers to questions direct 37 and 38, during the infringement of Kirk's patent by defendant as found by the court, how long during each year were the overflows on each of the dams used closed up for the reasons named in your answers to these questions?

A. It might run from the first of June or later—that is, in the dry season. From the first of June until November in 1886. The creek men generally kept the overflows closed up during the dry season. These dams at the mills were kept closed all the time in the dry season, and as a general thing from the time we commence to saw. The overflows were generally closed first, and then the bulkheads put in when the season got dryer. We needed all the water around the mill to carry away sawdust.

412.—2 X Q. You say that the creek men spend very little of their time managing the dams?

A. It takes a very small fraction of their time to manage the dams.

413.—3 X Q. How and where are they employed during the balance of the time?

A. Along the creek and at the pond and at the mill, driving and sorting logs. They keep the logs loose from the banks and obstructions in the streams and on the banks.

414.—4 X Q. Do these creek men work together in a gang or separately?

A. Sometimes in a gang and sometimes separately. If there were a lot of logs on the bank to roll in they might be all there
553 rolling them in. They might all not be there; some might be engaged in keeping the logs loose that were running down the stream; the logs that had been run in.

415.—5 X Q. What is the length of the creek of which these men have charge?

A. The way the creek runs, I would say about fifteen miles.

416.—6 X Q. Are you the same C. F. Fuller who has already testified for the respondent in this case, and whose testimony is printed on pages 1 to 17 and 105 to 123 inclusive, in defendant's paper book?

A. I am the identical man.

417.—7 X Q. Are you still engaged in the same business as when you gave the other testimony?

A. Yes, sir.

418.—8 X Q. State the location and number of the bear-trap dams provided with overflows which have been used since the defendant acquired title to the property—that is, since January 17, 1884?

A. There were five dams with overflows at that time. Two at the

mill; one what we call the Jo Hand or Chamber of Commerce dam; the Shaffer dam, located about two miles above the mill by a straight line, and Narrows Creek dam at the railroad. The fall of 1884 the Kilmer dam was built; we commenced using that in the spring of 1885; then in 1886, latter part of the fall, we built three dams: the Tom Keen, the Jo Hand dam and the dam near the Fair Ground; they were used, commenced in the spring of 1887. The Chamber of Commerce, the old Jo Hand dam, was torn out in the fall of 1886; and the Shaffer dam was torn out, as near as I can recollect, in the summer of 1887.

419.—9 X Q. Please state area and depth of the pools of several dams when filled?

Objected to as not proper cross-examination.

A. As near as I can give—the Narrows Creek dam, from 4 to 4¼ feet; the Kilmer dam raises 5½ feet. As to the area of the pools, I cannot give it with any accuracy. The Narrows Creek dam,
554 next to the railroad, may flow three acres when the water is at its highest; as to the Kilmer, it might be six acres, more or less; the Shaffer dam don't flow (in) the banks of the creek—it would back water about half a mile, more or less; this dam raises about three and a half feet (3½) feet; the Jo Hand dam raises just five (5) feet; area of the pool three acres, more or less; the Fair Ground don't flow any, just fills the banks of the creek; it backs the water up to the Jo Hand dam, about half a mile; this dam raises four (4) feet; the dam at the mill (the old dam that we tore out), raised about four and one-half (4½) feet; the other old dam, about the same; the area of the pool at the mill. No logs ever float outside of the banks of the dam and creek.

420.—10 X Q. Of what materials are the embankments of the pool made?

A. They are made of earth.

Redirect examination:

421.—67 Q. In order to cause the water to go over the surface of ground in the pools as indicated by you, how high must the water be running over the top of the dams?

A. At the Narrows Creek dam, we put a bracket board or plank of one foot in height. That would cause it to overflow the banks and cover the area mentioned. The Kilmer dam would raise to about six to eight inches above the bank of the creek when up; the Kilmer dam is not very low; the Shaffer dam only covers the channel of the creek; the Jo Hand dam—that raises five (5) feet, and the banks of the creek are very near five feet; when up running over the dam it would cover very little, only the little pool and hollows. The Fair Ground dam only covers the bed of the creek or channel.

422.—68 Q. Suppose you let the bear trap down, how long does it take the water in the pool to run down so that it is all contained in the channel of the creek?

A. I never timed it; perhaps fifteen or twenty minutes. I mean the Kilmer dam. The Jo Hand dam will take shorter time. The Narrows Creek dam would run all out in about thirty minutes; that is a splash, only large enough to float logs out.

555 423.—69 Q. You can state whether there is or is not what is called the Tunnel dam; how much water does it raise, how high?

A. There is such a dam; it raises fourteen (14) feet.

424.—70 Q. If the dams on the Sandy Lick creek below it were not supplied by water from it by letting off splashes, how would it effect their utility in the dry season for getting the logs down or filling the pools of the dam?

A. Could not do it at some stages of the dry season without it.

425.—71 Q. State what effect it would have upon the usefulness of the bear-trap dams below the big dam, if this dam were removed and the natural water of Sandy creek not increased by artificial floods therefrom, but permitted to run as if no such dam were there?

A. There have been times when we could not get a pool of water in any of these bear-trap dams without the water from the Tunnel dam. It would destroy in dry season the usefulness of these bear-trap dams. The mill has laid still for two months for want of water to move logs, even with all the aid of the Tunnel dam and all. The size of the Tunnel dam is sixteen (16) and seventeen (17) feet in the bottom of the stream, and the area is about one hundred acres. It backs water about a mile. We keep it as a reservoir.

Complainant's counsel objects to the testimony of C. F. Fuller in answer to questions 56 and 57, and to the remainder of his testmony relating to the same subject-matter, for the reason that it is incompetent and irrelevant, and, further, that it is inconsistent and at variance with other testimony of the witness already in the case.

C. F. FULLER.

N. L. HOOVER, duly affirmed.

Examined by Judge JENKS:

426.—1 Q. You may state how high it was necessary to
556 raise the water in the bear trap or on the Du Bois proper in order to make a good artificial flood for driving logs.

A. We raise it to the top of the leaves and higher if we could get it.

427.—2 Q. What was done by you and what was necessary in relation to the lower end of the fore bay in order to raise the necessary water with the bear-trap dams — Du Bois property on the Sandy lick?

A. We closed them up so as not to waste the water.

428.—3 Q. What year was that?

Deposition of witness objected to as incompetent and irrelevant, by counsel for defendant.

A. The year 1885.

Cross-examination by J. P. BAKEWELL, Esq.:

429.—1 X Q. What is your business?

A. I am a log contractor.

430.—2 X Q. For whom are you acting as log contractor at the present time?

A. For John E. Du Bois, of Du Bois, and for Alfred Ball, of Rochester, N. Y.

431.—3 X Q. What period of the year 1885 do you refer to in testimony?

A. From about the first of May to about the first of July. That is as near as I can recollect.

432.—4 X Q. How many dams did you operate?

A. Two dams on Sandy creek, the Kilmer dam and the Shaffer dam.

433.—5 X Q. Are you the same Mr. Hoover who testified in this case, and whose testimony is found on pages 80 to 85 in defendant's paper book?

A. I am.

N. L. HOOVER.

557 IRVIN HORN, duly sworn.

Examined by Judge JENKS:

434.—1 Q. State whether you are one of the creek men, and what you are.

A. Yes, sir; I am. I am the foreman of the creek men.

435.—2 Q. Who has charge of the bear-trap dams during the log-driving season?

A. I have.

436.—3 Q. In order to make a good artificial flood by those dams to drive logs, how high ought the water to be raised?

A. The dams should be full and running over, five or six inches.

437.—4 Q. In order to raise these floods, what is necessary and what was done in reference to the overflow at the lower end of the fore bay?

A. We had them nailed up. Nailed shut.

438.—5 Q. How much time is spent in managing and caring for these dams during the log-driving season?

A. Not over five or ten minutes a day for each dam.

439.—6 Q. You can state whether more time than this was necessary.

A. No, sir; it was not.

440.—7 Q. What control, if any, did the wickets give you over the dam?

A. The wickets have full control over the dam.

441.—8 Q. Where was your time spent after you had raised and lowered the dam during the balance of the day?

A. Driving the logs to the mill, and after they get there, they are sorted and put in their places.

Cross-examination by J. P. BAKEWELL, Esq.:

442.—1 X Q. Are you the same Mr. Horn who has testified in this case, and whose testimony is found on pages 96 to 101 inclusive in defendant's paper book?

A. I am.

443.—2 X Q. When you say that you had the overflow nailed up, you mean that was your practice during the dry season?

558 A. We nailed them up in the spring when we commenced driving logs.

Deposition of foregoing witness objected to by counsel for plaintiff, as incompetent and irrelevant.

W. I. HORN.

C. C. BRENNEMAN, duly sworn.

Examined by Judge JENKS:

444.—1 Q. You are one of the log-drivers, as well as Mr. Horn and Mr. Hoover?

A. Yes, sir.

445.—2 Q. You can state who has charge of the bear-trap dam during the log-driving season?

A. Mr. Irvin Horn.

446.—3 Q. How is it necessary to raise the water of these dams to make a good artificial or log-driving flood?

A. The dam should be full and running over the dam six or eight inches.

447.—4 Q. In order to raise these floods by these dams, what was necessary and what was done in regard to the overflows at the lower end of the fore bay?

A. They were boarded up, so that the water could not run over.

448.—5 Q. How much time was spent and was necessary for caring for and managing the dams?

A. Five or ten minutes to each dam.

449.—6 Q. Where did you spend the balance of your time, and what were you doing?

A. Driving and handling the logs, and sorting them at the mill.

450.—7 Q. State whether there was more time necessary than you have stated in handling and managing these dams?

A. No, sir; there was not.

451.—8 Q. What control, if any, did the wickets give you over the pressure of water and leaves of the bear-trap dams?

559 A. Full control.

452.—9 Q. Did you ever use the float that is in the fore bay of the Jo Hand dam in fixing the height of the leaves at a point you desired, and what effect had it, last fall?

Objected to as incompetent and irrelevant. Objection sustained.

453.—10 Q. How long have you been in the creek crew, and how long has Mr. Horn and Martin Hoover been in the crew?

A. I have been in the crew for four years; Mr. Hoover came at

the same time that I did; Mr. Horn came on the year after as foreman.

454.—11 Q. You can state whether the management of the overflow that you have spoken of was the same during the time that you have been one of the creek men?

A. It was the same.

Deposition of witness objected to by counsel for plaintiff, as incompetent and irrelevant.

Cross-examination by J. P. BAKEWELL, Esq.:

455.—1 X Q. In driving logs do the creek men work together or separately?

A. If there is a jam, we help each other; but if not we work separately along the creek in driving the logs. We may be one hundred, or two hundred, or three hundred yards apart. It depends upon the condition of the stream; we are within calling distance; that is, not all within calling distance of each other, but one within calling distance of another.

456.—2 X Q. You are the same Mr. Brenneman who testified in this case, and whose testimony is found on pages 66 to 70 in defendant's paper book, and are you still in the employ of Mr. Du Bois?

A. I am, and am still employed by Mr. Du Bois.

C. C. BRENNEMAN.

560 MARTIN HOOVER, duly affirmed.

Direct examination by Judge JENKS:

457.—1 Q. Who has charge of what is called the bear-trap dams during the log-driving season?

A. Irvin Horn.

458.—2 Q. In order to make a good artificial flood to drive logs, how high ought the water to be raised by these dams?

A. Just as high as you can get it.

459.—3 Q. In order to raise these floods, what was necessary and what was done to what is called the overflow at the lower end of the fore bay during the log-driving season?

A. We boarded them up.

460.—4 Q. How much time is spent in managing and controlling the dams each day?

A. About ten minutes to each dam.

461.—5 Q. Was more time than this necessary?

A. It was not.

462.—6 Q. You can state what control the wickets give over the leaves and pressure of water under the dam?

A. Full control. You can set the leaves just where you want them.

Cross-examination:

463.—1 X Q. How did you close the lower end of the fore bay?

A. Nailed them up. We did not have planks or movable brackets.

Deposition of this witness objected to as incompetent and irrelevant.

MARTIN HOOVER.

J. HENRY COCHRAN, duly sworn.

Examined by Judge JENKS:

I reside at Williamsport, Pa.

464.—1 Q. State what business you are engaged in?

A. I am in the lumber business, chiefly.

561 465.—2 Q. State how long you have been in the business in this State?

A. About twenty-five years.

466.—3 Q. Have you any practical knowledge of driving logs?

A. I have. That is my trade.

467.—4 Q. Can you state the number of feet of lumber you have driven in that time?

A. I would say about a thousand of millions.

468.—5 Q. State whether you are acquainted with the stream called Sandy lick, running through the Du Bois property?

A. I am.

469.—6 Q. You can state whether you did or did not make an examination of several of the bear-trap dams on the Du Bois property?

A. I did.

470.—7 Q. You may state as to its size, crookedness, lowness of the bank, the quantity of the water running in the stream, say from about June first till about November?

A. During those months it is a very small stream, and has very little water in it, except in case of heavy rains. It is very crooked, and has low banks.

471.—8 Q. You can state where dams are built for the exclusive purpose of raising artificial floods for driving logs in such a stream what is requisite as to their tightness, and the necessity there is for this tightness in order to raise and retain the necessary amount of water in the dry season of the year?

A. To have the dams valuable for driving purposes, it is absolutely necessary that they be made tight, so that no water will escape from them. If they were not, during the dry season, you could never raise a head, there being so small a quantity of water in the stream.

472.—9 Q. You may state whether there would or would not be necessary in order to raise the necessary water, to close up as far as possible, every orifice or leak in all dams not exceeding five feet and one-half in height, in order to give such dams efficiency in raising the amount of water necessary to drive logs, during the dry seasons, on the Sandy lick above the Du Bois mills?

562 Objected to as irrelevant.

A. It would be very necessary.

472.—10 Q. Suppose an overflow from the lower end of the fore

bay, which is three feet wide, which was from 20 to 22 inches below the apex of the leaves of the dam was permitted to remain open so as to continually discharge the water when it rises to a level with lower part of the opening and as it increases in height in the opening, what effect would such orifice have on the utility of such dam during the dry season?

Objected to as irrelevant.

A. If the water in the fore bay was supplied by an open wicket, connected with the main pool of the dam of say 18 x 20 inches, it would in my opinion, utterly destroy the usefulness of the dam for log-driving purposes in such a stream as this one described, for the reason that the dam would never fill with water to the apex or top of the gates.

474.—11 Q. You have stated that you have seen the bear-trap dams on the Du Bois property—you may now state as a practical lumber and log driver, whether such dams as those erected on the Du Bois property which have no overflow at the lower end of the fore bay, require to be put in the special care of any one in order to protect them from injuries?

Objected to as incompetent and irrelevant.

A. I should say not. The reason is that dams of this height, if the gates are properly constructed and well secured, cannot be injured from any pressure of water that can be brought to bear upon them. I will add that in dams of this size I would consider the plain, simple bear-trap gate without either fore bay or waste of any kind preferable to anything I have yet seen or heard of.

Counsel for defendant objected to the depositions of this witness, as being incompetent and not relevant to any of the issues in this case, and therefore declines to examine.

J. HENRY COCHRAN.

563 Counsel for defendants offer in evidence book entitled, "A Manual of the Steam-engine and Other Prime Movers," by William John Maequon Rankine, published in London, by Charles Griffin & Company in 1870; offers specially the following extract from page 97, as follows:

Also offers specially from chapter IV, page 107 of same book the following extract:

Also from the same book, extract from article 139 entitled, "Water sluices," found on page 153, as follows:

Offers of book and the extracts therefrom objected to by complainant's counsel as irrelevant to the issue.

Adjourned to meet at Pittsburgh, on Thursday, February 28, 1889, at 9 o'clock a. m.

No. 240
DuBois
v.
Keik
&
No. 259
Keik
v.
DuBois

b. 564 a

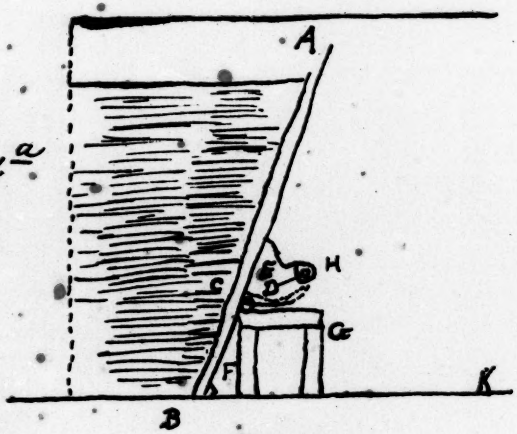


Fig 48

Extract from a Work Entitled, "A Manual of the Steam-engine and Other Prime Movers," by William John Maequon Rankine. London, 1870.

Chapter 11. Of water-power engines in general. Page 97, sec. 95. Parts and appendages of water-power engines. In every water-power engine, or in connection with it, there exists the following parts, or parts equivalent to them:

I. The channel of supply, or head race, whereby water is brought to the engine, and which extends from the beginning of the fall to the place where the water begins to act on the mechanism. It may be an open conduit, or a close pipe, or a combination of both. Economy of power requires that it should be as large as possible; economy of first cost that it should be as small as possible. The right mean is a matter for the judgment of the engineer in each particular case. This channel usually commences at a head reservoir or pond, and the lower end of it is sometimes of such
564 dimensions as to constitute a second reservoir or pentstock. The lower end of the supply channel is of various kinds and forms, according to the nature of the engine.

II. The waste channel, or bye-wash, whereby any flow of water which is in excess of that required for the stream, and which there is not reservoir room to store, is discharged into the natural drainage channels of the country. This generally commences with a wier, or overfall, forming a part of the boundary of a reservoir, and of such length that the greatest possible flow of waste water can escape over it without rising to a dangerous or inconvenient height.

III. The regulator, being the sluice, valve or other apparatus whereby the flow of water delivered by the head race to the engine is adjusted to the work to be performed. For reasons which will afterwards appear, economy of power requires that the regulator should be as close as possible to the engine, and therefore at the lower end of the channel of supply. The regulator is very frequently controlled by a governor, usually of the revolving pendulum class (art. 55), of which the details will be exemplied farther on.

Also following extract from same book, page 153, section 139:

Waste sluices in a wall forming part of the weir are used to enable the surplus water of floods to be discharged with a lower elevation of the surface of the pond, and a less extent of back water, than would be practicable if all the surplus flow had to pass over the weir crest. A self-acting waste sluice invented by a French engineer, M. Chaubart, is shown in Fig. 43—

(Here follows diagram marked p. 564*a*.)

which is a vertical section. It has been found to answer well where it is required to maintain the surface of the water in a pond or canal very accurately at a certain level.

A B is the sluice or valve plate, represented as shut, its upper edge A being at the proper water *water* level.

The sluice is supported by a pair of cast-iron sectors resting on horizontal platforms. E is one of those sectors; F G its platform. The edge of each sector has a groove, in which lies a chain, fixed at F to the platform, and at H to the sector. This pair of chains resist the tendency of the water to press the sluice forward. When the water is at the level of A, the resultant of its pressure acts at a depth A C, which is two-thirds of the whole depth A B of the sluice. Through C draw C D perpendicular to A B cutting the center line of the chain F H in D. Then the sectors and platforms must be so formed and placed, that when the sluice is shut, the point of contact of each sector with its platform shall be vertically below D; and then the combined resistance of the chains and platforms will be directly opposed to the pressure of the water, and will balance it. When the water rises above A and begins to overflow, the center of pressure rises above C, so that the pressure and the resistance are no longer directly opposed. The sluice then rolls upon its sectors into a new position of equilibrium, and in so doing, it not only depresses the edge A, so as to make the overflow more rapid, but raises the edge B, so as to make an outlet at the bottom of the passage B K through which the surplus water escapes much more rapidly than it could do by merely overflowing.

565

Also the following extract from same book: Chapter IV.—Of water-pressure engines. Page 107.

SECTION 1. General principles. 104, parts of a water-pressure engine. In a water-pressure engine, the several principal parts mentioned in article 95 as belonging to water-power engines in general, take forms suited to that class of engine.

I. The head race consists of a supply pipe leading from the reservoir to the working cylinder. That pipe, together with the reservoir, constitute what is called the pressure column. Besides the regulator, to be presently mentioned, there should be a stop valve, or sluice at the upper end of the supply pipe, in a close to the reservoir, so that in the event of an accident occurring to the supply pipe, the current of water may be prevented from entering it. There should also be a grating to prevent the entrance of solid bodies from the reservoir.

All water contains air diffused through it, and most water contains sediment. If there are summits and hollows in the course of the supply pipe (which is often of great length,) the air collects at the former, and the sediment at the latter. There should be a cock at the upper side of each summit in the course of the pipe, for blowing off air, and at the lower side of each hollow for blowing off sediment.

566

II. The bye-wash has no peculiarities arising from the class of engines.

III. The regulator is a valve of one or other of certain kinds to be afterwards mentioned, which are capable of being adjusted to any required extent of opening.

And now, Thursday, February 28, 1889, parties met pursuant to adjournment.

Present: W. L. Pierce, Esq., for plaintiff; W. P. Jenks, Esq., and T. H. Baird Patterson, Esq., for defendant.

Counsel for defendant offers copy of letters patent No. — to Josiah White, dated Oct. 19, 1819, for the purpose of showing the existence of bear-trap dams and the general nature of their construction.

WILLIAM HAWK sworn—called on part of defendant.

Examined by Judge JENKS:

I now reside at Caledonia, Elk county, Pa. I came from Luzerne county in 1854, and I lived within two miles of the Lehigh river.

475.—1 Q. State if you know anything about what are called bear-trap dams.

A. Yes, sir,

476.—2 Q. State how you know, and how long your experience with them continued.

A. I tended them for a long time.

567 477.—3 Q. State how the water was got under the leaves of the bear trap.

A. By wickets; by closing the two lower ones and opening the two upper ones.

478.—4 Q. State how they were formed with relation to any stops, if any stops existed.

Objected to as irrelevant.

A. By stops on the guard walls on each side of the chute, and also five clutches: the upper ones were bolted on the under side of the top gate, and the lower ones on the top side of the under gate.

479.—5 Q. What effect had these stops in preventing the further rise of the gate?

A. The gate could not rise any further than the height of these stops without breaking them.

480.—6 Q. How high, when the gate was fully up, was the upper leaf above the breast of the dam?

A. About two feet.

481.—7 Q. Can you state what dam was this you speak of?

A. The Pine Forest dam, on the Lehigh river.

482.—8 Q. Can you approximate the width of the entire dam, including the bear-trap chutes?

A. Near three or four hundred feet.

483.—9 Q. State what their power (the bear-trap chutes) was to resist pressure?

Objected to by counsel for plaintiff as irrelevant.

A. They would resist all the pressure that was brought upon them. The Pine Forest dam was the one I tended. I tended it for five or six years.

484.—10 Q. You can state what amount of attention was required to take charge of these dams.

A. We used to go down in the afternoon and raise the gates and let them stand until the raftsmen would open them. That was all the attention we ever gave them. They did not require any other attention.

485.—11 Q. When the running season was over, was any attention needed then?

568 A. No, sir.

486.—12 Q. You may state in regard to their strength when ice floods pass over them, what power they had to resist them.

A. They resisted everything—ice floods, logs, etc.; once they were frozen up all winter, and all the ice and logs passed over them without injuring them.

487.—13 Q. You left there in 1854; what age were you when you commenced tending this dam?

A. I was twelve years old in June of the year when I commenced tending the dams. I tended them for five or six years, and then left in 1854.

488.—14 Q. You can state what power you had to control the pressure of water when under the gates, and how you regulated the height of the gates.

A. We regulated the height by means of the wickets. We could lower the gate either one foot or two, or any distance we desired, and stop them; that was what we called cocking the gates; and the gates would stand at the height we put them as long as there was water in the pond.

489.—15 Q. Do you recollect of any particular circumstance that enables you to remember all about the gates and their management?

A. I do. I made a model of the dam and put it in a little stream. I worked two summers at making my dam.

490.—16 Q. You may state generally the strength and sufficiency of these bear-trap dams constructed on the Lehigh river to resist pressure.

A. I never knew of any of them to break, or never knew any of them to be repaired after they were built.

491.—17 Q. How does the volume of water in the Lehigh compare with the volume of water in the Sandy Lick creek on the Du Bois property?

A. The Lehigh river is a very rapid stream, and the Sandy lick has almost no current at all.

492.—18 Q. What do you recollect about the width of the bear-trap gates?

569 A. About eighteen or twenty feet wide.

No cross examination by counsel for plaintiff.

WILLIAM HAWK.

Mr. JOHN HORNER, recalled on part of defendant:

493.—1 Q. Do you know what is called the Big Tunnel dam?

A. I do. It is on the Sandy lick at Sabula.

494.—2 Q. Where is the water which is stored in this dam collected?

A. In the spring.

595.—3 Q. What is the purpose of collecting and storing the water in the pool of this dam?

A. For a reservoir of water, for holding a supply of water in our bear-trap dams on the Sandy lick when the water becomes so low that they will not fill from the natural sources.

496.—4 Q. About what time does this usually commence?

A. About the first of August.

497.—5 Q. You may state what effect the unavoidable leakage and evaporation has upon the amount of water, even in the large dam, from the time the spring floods cease and the dry season commences when the dam is used in August.

A. I just know that fact from the report of the log-drivers. I do not know of it as a fact personally.

498.—6 Q. You may state what you know as a fact as to the effect of using the water in that dam recklessly, after and about the last of May.

A. The effect is, that when the dry season commences we have no water, and we have to stop the mills, as we cannot drive the logs. Each year up to 1885 we had to stop the mills on account of want of water to drive the logs.

499.—7 Q. You can state the absolute necessity of husbanding and saving the water in each and every dam, in order to drive logs in the dry season without stopping the mills.

A. We have to use the greatest care and economize the water in every way, in each and every dam.

570 Cross-examination by W. L. PIERCE, Esq.:

500.—1 X Q. What changes have been made in the bear-trap dams at Du Bois since the injunction in this case in December, 1887?

A. I don't think of any, except the nailing up of the lower wall of the fore bay. We nailed the fore bays up whenever they were down.

501.—2 X Q. Have you visited during the last year any of these bear-trap dams which were so nailed up?

A. Yes, sir.

502.—3 X Q. Have you noticed that the water in the fore bay is a number of inches lower than the water in the upper pool in these dams which were so nailed up?

Objected to, as not cross-examination.

A. I know the fact that the water in the fore bay is lower than the water in the pool in the upper dam.

503.—4 X Q. Why is that?

Objected to, as not cross-examination.

A. I should think it was the leakage from the lower gate that caused it.

504.—5 X Q. Have you also observed that the level of the upper

pool may be varied, while the level of the fore-bay pool will remain constant?

Objected to, as not cross-examination.

A. The conditions will remain the same. There will be a difference, I should say; even if the water rises in the pool, it may be higher than the water in the fore bay.

Redirect examination:

505.—1 Q. In your answer to the last question, do I understand you to say that you mean that while the water continues to rise in the pool, that the water in the fore bay will remain stationary; or that the water in the fore bay will in some measure rise with the water in the pool?

571 A. I mean that the water in the fore bay will rise in some measure with the water in the pool.

JOHN HORNER.

C. F. FULLER, recalled on behalf of defendant:

506.—1 Q. You have already spoken concerning the Big Tunnel dam?

A. I have.

507.—2 Q. You may state what is the purpose of storing and collecting the water in the Tunnel or Sabula dam?

A. Used as a reservoir for holding water to drive logs to the mill. We use this water when all the natural resources cease to fill the other dam on the Sandy lick below the big dam. This usually commences about the first of August.

508.—3 Q. State when the water in this dam is collected?

A. In the spring of the year, during heavy rains.

509.—4 Q. You may state what effect the unavoidable leakage or evaporation has upon the amount of water in this dam from the time the dry season commences (about June first), to the first of August?

A. From three to four feet. Some years it is more than others.

510.—6 Q. You may state the effect it would have were you to use the water out of the big dam recklessly, commencing the last of May or first of June.

Objected to as immaterial.

A. It would not fill again after the last of May. If we run the dam out about the last of May or last of June, it would not fill again unless there was an extra flood of water.

511.—6 Q. You may state the necessity, if there is any, for husbanding and saving the water in the dams owned by John E. Du Bois and used for log-driving purposes, in order to make them effectual for driving logs during the dry season.

A. It is absolutely necessary.

(Model of the Jo Hand dam offered by Judge Jenks as an illustration.)

572 512.—7 Q. Is this a substantial model of the Jo Hand dam?

A. It is. That is the workings of it.

513.—8 Q. You can state how the dams last built, since 1884, compare with respect to their substantiality to those first built, before 1884?

A. They are much stouter built since 1884 than before that time.

By Judge JENKS: We refer to what witness states is a substantial model of the Jo Hand dam bear-trap dam as explanatory and illustrative of the testimony of the witness, so that the same may be understood by the master, and is used only for the purpose of illustration.

All introduction of the model in question, so far as it does not accurately represent the Jo Hand dam as actually constructed is objected to by W. L. Pierce, Esq., counsel for plaintiff.

514.—9 Q. You may state in relation to the building of the bear-trap dams, how long you sink the body of all the bear-trap dams.

A. We sink them to a level of the bed of the creek; that is, the top of the leaves of the dam to the level of the creek, so that when we let the leaves down it draws the pool dry.

515.—10 Q. You can state what kind of a dam the Tunnel dam is?

A. It is a drop gate; it was formerly a bear trap, but never had any overflow.

516.—11 Q. You can state how wide the chute in this dam is?

A. The water-way is five feet. The breast of the dam is built from mountain to mountain.

517.—12 Q. How about the width of the bottom, lowness of the banks, and the number of bayous extending into the bottom lands into the streams from the mills to the Tunnel dam?

A. The bottoms are wide, the banks of the stream low; a great many bayous between the mill and the tunnel, with number of rills coming in from the bottoms and emptying into the stream.

573 Cross-examination:

518.—1 X Q. In what respect does the model of the bear-trap dam produced differ from the Jo Hand as it actually is?

A. There is no difference in the working of the dam. The only essential difference is the extension of the guard walls, and they do not interfere with the working of the dam.

C. F. FULLER.

JOHN E. DU BOIS, recalled on part of plaintiff:

518.—1 Q. You may state whether you have—did you, or did you not, measure the distance between the banks of the Sandy Lick creek above the pool of the Tunnel or Sabula dam, and, if so, how far is it at the top of the banks from bank to bank?

A. I did so, and found it to be about fifteen feet.

519.—2 Q. You may state if you did measure in the bottom of the stream how wide it is from water edge to water edge at this time, there being a fair quantity of water?

A. I cannot say.

520.—3 Q. You may state whether this stream, as well as other small streams on your property, does not become very low during the dry season.

A. They become very low.

512.—4 Q. You say that the distance between the banks is about fifteen feet. Can you approximate how wide the stream now is as it runs in its bed?

A. It would vary, and I suppose in some places it would be reduced to about eight feet wide.

No cross-examination.

JOHN E. DU BOIS.

574 *Testimony in Rebuttal.*

And now, March 11th, 1889, met pursuant to adjournment.

Present: Same counsel as before.

Testimony of John Krause.

JOHN KRAUSE, duly sworn, called in rebuttal, examined by W. L. PIERCE, Esq.

I am 25 years of age; I reside at Caledonia, Pa.

Int. 247. What is your business at Caledonia?

Ans. Firing on the Caledonia saw-mill.

Int. 248. Have you any other duties?

Ans. In winter I work at most everything in the lumber yard.

Int. 249. How many bear-trap dams are there at Caledonia?

Ans. There is one bear-trap dam there.

Int. 250. Composed of how many chutes?

Ans. Two.

Int. 251. Have you ever done any work on this dam, and if so, what?

Counsel for complainant offers to prove by the witness on the stand that he is thoroughly familiar with the construction and operation of the Caledonia dams, and that they are similar in all essential particulars with the dam at Du Bois, and that repeated attempts have been made at the Caledonia dams to control the pressure of the water and the elevation of the leaves by means of cock-
575 ing or setting the wickets, and that such attempts have repeatedly proved failures; and further, that repeated attempts have been made at the Caledonia dams with automatic regulations by means of floats and levers, and that every such attempt has proved a flat failure; and further, offers to prove the extent of the hydrostatic pressure on the leaves of these dams tending to wreck the dams, and to cause leakage and strain by reason of such pressure,

showing that such heavy dam leaves buckle or bulge fourteen inches out of line.

(Objected to as incompetent and irrelevant by counsel for defendant, and also for the reason that his offers are not sufficiently specific to make it proper rebuttal in defendant's case-in-chief, and further, for the reason that all of it, if competent, should have been offered in chief; and further, for the reason defendant's offers of similar testimony were ruled out by the master.)

(Objection overruled for the present.)

Ans. I have tended to the dams, off and on, for five years or more; this is the Caledonia dam I refer to. I have tended to the splashing part, leaving off water when it was necessary.

Int. 252. Have you worked the wickets on this dam?

Ans. I have.

Int. 253. How often, and to what extent?

Ans. I have worked them a dozen times a day. I have tended them on week days, and especially on Sunday.

(Objected to by counsel for defendant.)

Int. 254. How many months a year, if any, have you been employed, specially on Sundays, for the purpose of raising and lowering the wicket and regulating the height of the water on the Caledonia dam?

Ans. I have been employed for the purpose for about four years.

Int. 255. State the strength and the construction of the leaves of the bear-trap dam at Caledonia.

576 Ans. The leaves are made of square timbers, 6 x 8 I suppose.

Int. 256. Are these leaves braced by cross-timbers or timbers, and of what size?

Ans. They are braced by timbers not smaller than 12 x 12 inches.

Int. 257. Are they provided with side stops?

Ans. There are two side stops on each gate.

Int. 258. State what you have observed as to the amount of bulging there is in these gates when they have been raised against the side stops and the water has been introduced under them.

(Objected to as leading.)

Ans. I have seen these gates sprung up in the center from ten to twelve inches.

Int. 259. Do I understand that there are side stops on the lower leaves as well as on the upper at these Caledonia dams?

(Objected to as leading.)

Ans. Yes, sir, there are side stops on both leaves.

Int. 260. What effect has this bulging or buckling to the extent of ten or twelve inches have on the soundness and tightness of the lower leaf?

Ans. It might break. I suppose it would cause them to leak.

Int. 261. What effect would it have upon the tightness of the

joint between the leaf and the side stops—the lower leaf and the side stop?

Ans. I do not know what to say to this. I have nothing else to say.

Int. 262. Do you know whether there have been attempts to regulate the height of water in the Caledonia dam by means of floats and levers intended to raise and lower wickets automatically?

Ans. There are floats there. I suppose they were used.

577 Int. 263. Was such use given up or not?

Ans. Yes, sir, it was given up.

Int. 263½. Why was it given up?

Ans. I don't know whether it worked or didn't work.

Int. 264. What was used in the place of these floats?

Ans. They didn't work, and a man was put in to attend to them.

Int. 265. Have you ever tried cocking the wickets at Caledonia dam?

Ans. Yes, sir, I have tried to cock the wickets.

Int. 266. About how many times?

Ans. Quite a number of times; I don't know just how many times; I have set them quite often, or tried to set them quite often.

Int. 267. When you say that you have tried to set them, do you mean that you have tried to set them in such a way that the dam would stand at the same height when you left it, and when you came back?

Ans. That is what I meant.

Int. 268. Did you succeed in so cocking the wickets that the dam would remain fixed at the height you left it for a long period, say half a day?

Ans. I have set the gates, sometimes the gate would be down, and sometimes they would go up, standing up at their place.

Int. 269. Could you be sure when you left the wickets cocked that you would find the dam in the same height when you would come back an hour or two later?

Ans. No, sir; I could not be sure.

Int. 270. Did you go to the Du Bois dam with Mr. Kirk during last year?

Ans. Yes, sir; I did. I don't remember the month. It was last fall.

(Objected to for the reason that the time is not covered by this case.)

578 Int. 271. Did you visit the Tom Keen dam at that time?

Ans. Yes, sir.

(Same objection renewed.)

Int. 272. Was there or not any leakage between the lower leaf and the side wall?

Counsel for plaintiff offers by this witness to show that there was an opening made in the Tom Keen dam by cutting away the edge of the lower leaf to a width of 2½ to 3 inches, and of a length of at least a foot, which would act as a relief of the hydrostatic pressure

under the leaves of the dam, as the opening was of such a height as would permit the dam leaves to rise, but not to be subjected to excessive strain, and that such opening was but a subterfuge and an equivalent for the lowering of the end wall of the fore bay, as has been previously practiced, which fact is shown by numerous witnesses; by the defendant himself who has testified to the absolute necessity of closing every crack, seam and joint in the bear-trap dam for the purpose of economizing the water in the upper pool.

(Objected to for the reason that it is attempting to prove as part of the plaintiff's case-in-chief; that the play or space alongside the leaves of a bear-trap dam, is an infringement within the terms of the decree of the court which committed to you only the question of damages and profits therein specified, to wit, an elevated overflow at the lower end wall of the fore bay, and an essential part of his case-in-chief; and second, because the statement of the complainant's counsel as to the use of sawdust and bulkheads of defendant's witness, is not correct as stated; that testimony only had been given to show the utter uselessness of any overflow, outlet or leakage and the damaging character thereof to the practical use of bear-trap dams at the dryest season of the year, and had no regard to those periods of the year when there was high water sufficient to require any relief of the bear-trap dams, and objected to
579 for other additional reasons, and for the reason that it is opening the whole case.)

Complainant's counsel further offers to show that similar openings were observed in others of the Du Bois bear-trap dams in the summer of 1888.

(Same objection renewed.)

Objection overruled for the present.

Ans. The gate was not up at that time. I did not see the leakage, but saw the opening.

Int. 273. What was the size of the opening as near as you can tell?

A. I suppose it was a foot long and a couple of inches wide.

Recess at 2 o'clock p. m.

Counsel for plaintiff limits for the present the above offer only for the purpose of contradicting defendant's testimony, and not for the purpose of proving an additional infringement on part of defendant.

Met pursuant to adjournment.

Int. 274. How long does the dry season last on an average in your county at Caledonia? How many months or weeks?

Ans. About four months.

Int. 275. During that dry season are there, or are there not, occasional heavy rainstorms?

Ans. Yes, sir; there are.

Int. 276. Do or do not such rainstorms rapidly change the level of water in the pool?

Ans. Why, yes; it raises the water. It changes it very quick sometimes. I refer to the Caledonia pool.

Int. 277. Was, or was not, the pressure of water beneath the lower leaf of the Caledonian dam ever so great as to sweep away the lower leaf down the stream?

(Objected to as leading.)

580 Ans. Yes, sir; the dam swept out; that is the lower leaf, as I mind of.

Int. 278. Do you know who built Caledonia dam? If so, who?

(Same objection.)

Ans. Mr. John Du Bois, the old man.

(Objected to as incompetent and irrelevant.)

Cross-examination by Judge JENKS:

X Int. 279. John Du Bois, Sr., did not work on the dam himself, did he?

Ans. Mr. Du Bois was there. I have seen him there controlling the men.

X Int. 280. Did John Du Bois himself work on the dam?

Ans. I do not know.

X Int. 281. What men, or man, was there superintending the hands and directing them?

Ans. Mr. Gray.

X Int. 282. Did not Mr. Fuller help to build the dam—Mr. C. F. Fuller?

Ans. Yes, sir.

X Int. 283. Did not a man by the name of John Hawk also work on the dam?

Ans. I do not know Mr. John Hawk.

X Int. 284. Had the dam, when the leaves turned over, any side stop?

Ans. I am not positive, but I think not.

X Int. 285. Do you know what the size of the wickets were in that dam?

Ans. I do not.

X Int. 286. Sometimes you could and did control the height of the leaves and pressure of the water by means of the wickets?

Ans. Sometimes I could, and sometimes I couldn't.

X Int. 287. What was your general employment?

581 Ans. I was firing on the mill.

X Int. 288. Who had charge, the general charge of the dam at first?

Ans. I do not know.

X Int. 289. Was there not a man by the name of Zierden?

Ans. Yes, sir.

X Int. 289½. How long did Zierden have charge of that dam?

Ans. He had charge of it for several years?

X Int. 290. It is the Zierden—Nicholas Zierden?

Ans. Yes, sir.

X Int. 291. Do you remember the year the dam was built?

Ans. Yes, sir; it was built in 1882.

X Int. 292. The dam you speak of is on the Bennett's branch of the Sinnamahoning?

Ans. Yes, sir.

X Int. 293. The stream is a considerable larger one than the one above the Du Bois mills, is it not?

Ans. I am not positive, but think it is a heavier stream than the Sandy lick.

X 294. How often has Mr. Kirk been to see you about this matter?

Ans. Mr. Kirk saw me twice.

X Int. 295. The float you speak of at the Caledonia dam was a log; it was what you call a log?

Ans. No, sir.

X Int. 296. What was it?

Ans. It was a square concern made out of small timber and plank. There was one, I do not know whether they were nailed, bolted or glued together, it was in one piece.

X Int. 297. It was equivalent to a solid piece of wood, was it not?

Ans. Yes, sir.

582 X Int. 298. At the time the dam went over was it not during a great storm?

Ans. I think it was raining.

X Int. 299. Was there not a great wind?

Ans. I think there was.

X Int. 300. Don't you recollect that the wind was so great that it blew away a car that was fastened by a rope and that it broke the rope?

Ans. I do not mind about the car, and I do know about a rope.

X Int. 301. Don't the logs as they go over the dam, jar the lower leaves of the bear-trap dam terribly?

Ans. I don't know why they should, when the water is high to float the logs.

X Int. 302. Don't they often strike very hard against the side walls of the abutments?

Ans. Yes, sir. I think they do strike the abutments. I know they do

X Int. 303. Don't they sometimes break and dent it?

(Objected to as irrelevant.)

Ans. I did not see them break, as I mind of.

X Int. 304. Did you ever see the logs when they were going in a gorge through a dam, press the abutments very hard?

(Objected to.)

Ans. I don't know.

X Int. 305. Did you ever see the logs up end, pressing one upon one another?

Ans. I have, but not in the dam.

X Int. 306. Have you not seen parts of the chute below the dam torn out by force of the water and logs?

Ans. I have.

X Int. 307. You have often seen the chute below the dam broken by force of the water and logs—at any dam?

Ans. I have seen chutes broken.

583 X Int. 308. You never saw the leaves flop since the side stops were there, did you?

Ans. No, sir.

X Int. 309. And there was but one of these out of the two that went over?

Ans. Just one.

X Int. 310. Don't the raising and depression of the leaves wear them a good deal at the sides?

Ans. I should judge it would.

X Int. 311. The more they are used the more open they become? Do they not?

Ans. I did not take notice. They leak worse than when they were made, that is a sure thing.

X Int. 312. Do they not put down the Caledonia dam in the fall and let it lay until spring?

(Objected to as not cross-examination.)

Ans. Yes, sir; they do.

X Int. 313. Does not the ice freeze between the leaves and the abutments?

Ans. I do not know. I have seen ice all over it. I never saw the ice freeze between the leaves and the abutments.

X Int. 314. You have seen it freeze all over the leaves between the abutments?

Ans. I have seen it freeze; I have seen ice there.

X Int. 315. You say that you saw an opening about two inches wide and about one foot long in the Tom Keen dam, at the side of the leaf?

Ans. Yes, sir; I have.

X Int. 316. You can state whether it was cut in there or broken in there.

Ans. I do not know whether it was cut or broken in there.

X Int. 317. State which side of the gate that leak or opening was.

584 Ans. It was on the left-hand side of the gate looking downstream. I can't tell whether it was on the upper or lower pier. I don't understand the last part of my answer. There was very little water running there in the stream. I hardly know which way the water was running, as there was little water running there.

X Int. 318. Were not the gates dry, laying out of water, so that you could walk on them?

Ans. No, sir; they were not.

X Int. 319. What date was this when you saw the gate?

Ans. I think it was the first of January, 1889.

X Int. 320. How came you to say in your former answer in direct examination that it was last fall, and now you say that it was in January, 1889?

Ans. I did not know and do not know yet, but think it was in January, 1889, since I have studied it over.

X Int. 321. Have you talked with any one about this since our adjournment at noon?

Ans. I have talked about this matter since noon.

X Int. 322. With whom did you converse since the noon adjournment and about what matter connected with this case?

Ans. I have talked with Mr. Kirk going down, and talked about these matters.

X Int. 323. By this you mean Mr. Arthur Kirk, the complainant in this case?

Ans. Yes, sir; Mr. Arthur Kirk.

X Int. 324. Did he talk with you about the dry season, the dam wickets, and the other new matter in which you were interrogated in the after-dinner meeting?

Ans. I don't recollect what we were talking about. I ate dinner with him.

Redirect:

R. D. Int. 325. Please state the amount you were paid by Mr. Kirk for coming from Caledonia and testifying in this case?

585 Ans. He promised to pay me my fare and a couple of dollars a day for the time I am here.

R. D. Int. 326. Have you any other interest whatsoever in this case?

Ans. No.

JOHN KRAUSE.

Testimony of Arthur Kirk.

Mr. ARTHUR KIRK recalled in rebuttal.

Examined by W. L. PIERCE, Esq.:

Int. 326. In order to cock the wickets of the bear-trap dams at Du Bois so that the leaves will remain stationary, what relation must the upper wicket sustain to the lower wicket, and how must the opening at the lower end correspond with the opening at the upper end, when it is required not only to keep the dam elevated at a certain fixed height, but also to avoid the hydrostatic pressure under the leaves; in other words, how must the wickets be set?

Ans. The leakage of the one must be exactly the leakage of the other.

Int. 327. Would you call that leakage, or would you call it inflow and outflow?

(Objected to by counsel for defendant as not a proper question, as suggesting to the witness a change of term which his counsel thinks may prove dangerous, and a covert attempt to inform his client of the subject-matter of what he claims as his invention.)

(Objection overruled.)

Ans. When the dam has been raised, and it is desired to maintain it at that height, the wickets would have to be so much closed as to permit very little water to pass out or in, but I think the term leakage describes the operation better than the term inflow and outflow.

586 Int. 327. If the wickets are not set exactly equal, and the inflow exceeds the outflow, will, or will not the hydrostatic pressure be developed under the leaves of the bear-trap dam?

Ans. Yes.

Int. 328. If the wickets are not set exactly equal, and the outflow exceeds the inflow, what effect will this have upon the leaves of the bear-trap dam?

Ans. They will go down.

Int. 329. In your opinion, is it possible for a man to set the wickets evenly balanced from day to day with such a degree of certainty that it would be prudent to rely upon them to prevent on the one hand the dam falling, and on the other hand the development of hydrostatic pressure under the leaves?

(Objected to because the complainant is not by profession a mechanic or hydraulic expert, and the evidence in this case does not prove that he is an expert in such matters, he never having practically operated or built a dam.)

(Objection overruled.)

Ans. I do not think it could be done.

Int. 330. Assuming that it were possible for a man to set the wickets so evenly balanced from day to day, so that, so far as regards their position, the dam would neither fall nor be subjected to hydrostatic strain, would it, or would it not be prudent to rely upon the fact that the upper orifice and the lower orifice would remain of the same size without being choked up?

(Same objection continued by counsel for defendant, and also because it asks the witness a question *whether* if answered in the negative would contradict the witness' former testimony and affidavit in this case.)

The objection founded, complainant's counsel states on an apparent misstatement of facts.

Ans. No, it would not be prudent to depend upon them remaining so.

587 Int. 331. When you visited Du Bois in company with Mr. Bakewell, Col. T. P. Roberts, and the master some time in the latter part of last year, what facts did you observe about the leakage on those of the Du Bois dam upon which the fore bays had

been nailed up, and which are part of the subject-matter of this accounting?

This question asked for the purpose of showing how the defendant has operated his bear-trap dam since the infringement.

Admitted for the purpose of rebuttal of defendant's testimony, but not for purpose of showing infringement.

Ans. I observed in the first place, that supposing the dam was up, any dam, and the lower wicket closed, the moment that we opened the upper wicket the leakage from all the openings was instantly increased.

Int. 332. How large was this leakage on any of the dams, and specify what dam?

Ans. On the dam first below the mill when we opened the upper wickets the water flowed from an outlet between the lower leaf and the fore-bay wall to eject it; a large stream of water at four feet across the dam, from an opening between 18 inches and two feet below the apex of the dam when up. The same thing on the same principle applied on the Kilmer dam, and as near as I can recollect the other dams were locked and we had no opportunity of testing them. I was deceived as to the distance of the Tom Keen dam. Judge Jenks told me that it was five miles to the Tom Keen dam; when we were at the Tom Keen dam Judge Jenks told me that it was five miles to the Tom Keen dam, and I did not go there.

Int. 333. What season of the year was the trip?

Ans. I think it was about November.

Int. 334. Did you not observe any buckling or strain upon the lower leaf of any of these dams when up against the side stops in those dams *which* the fore-bay walls had formerly been cut down, and subsequently nailed up?

Ans. I scarcely observed any buckling of the lower leaf of
588 any of these dams, for there were no side stops on the lower leaves of any of them, but I observed that by some secret means that I could not detect, the height of the water in the fore bay in the old dam below the mill remained stationary about 14 inches below the peak of the dam when up. The Jo Hand dam, I think was about 20 inches, and the Kilmer dam was about the same.

"But I observed that by some 'secret means' that I could not detect, the height of the water in the fore bay in old dam below the mill remained stationary."

(The above clause from the above answer is objected to as improper and unseemly testimony by the complainant.)

X Int. 335. What was the height of the water in the fore bay as compared with the level of the water in the upper pool in these dams to which you referred, was it above or below?

Ans. It was below the level of the upper pool in all the dams. In the Tom Keen it remained for two hours at a stationary height below the apex of the dam when the dam was up about 22 inches; and the height of the water in the upper pool had in the meantime

raised 8 inches, but the water in the fore bay remained at the same comparative height as the peak of the dam, and the other dams were in the same proportion.

Adjourned to meet on Wednesday, March 12th, 1889, at 9 o'clock.

And now, Wednesday, March 13th, 1889, parties met pursuant to adjournment.

Present: Same counsel as before.

ARTHUR KIRK—examination continued:

Int. 336. Did you ever inspect the Tom Keen dam in company with Mr. Krause?

Ans. Yes, sir.

Int. 337. What did you observe as to the condition of the lower leaf?

589 Ans. This sketch which I hold in my hand gives it as well as I can describe; that is, as near as I could observe it from the icy condition of the surroundings.

Int. 338. You made this sketch?

Ans. I made the sketch myself from memory.

Sketch offered in evidence by complainant's counsel with request that it be marked "Tom Keen dam opening."

(Objection to offer made by counsel for defendant.)

(Offer admitted.)

Cross-examination by Judge JENKS:

Sketch shown witness, and witness testifies: The break was about a foot in length, and about two inches wide at the upper edge, and about three inches in the widest part; then the lowest end was about an inch in width.

X Int. 339. You say then the "Tom Keen" dam had at the right side of the lower gate of the down-stream leaf at the upper end where the upper leaf commenced to lap a break or opening about a foot in length; at the upper end of the break or opening about two inches wide, it then crooked out until it became about three inches in the centre; it then bent or crooked inwards towards the abutment until it was about one inch?

Ans. This is correct.

X Int. 340. Does not ice and frost and freezing weather operate in such a way as to open the crevice between the leaves and the chamber wall of the leaf chamber?

Ans. It did not in this case. It depends upon whether it is frozen or not. Yes, if it freezes.

X Int. 341. Does not the constant use of the leaves by elevation and depression tend to increase the size of the crack between the leaves and the wall of the abutment or fore bay?

Ans. Very little, scarcely perceptible in bear-trap dams, such as used by Du Bois.

590 X Int. 342. As the dam gets older, do not the leaves get looser?

Ans. They do.

X Int. 343. Don't their use enlarge the crevice between the leaves and the wall chamber?

(Objected to as having been already answered.)

Ans. Yes.

X Int. 344. Isn't there caused by freezing, by use and by exposure, when the dam is down to the sun's rays, a constant and unequal expansion of the gate chamber?

Ans. No, sir.

X Int. 345. You say then there is no contraction or expansion?

Ans. There is none perceptible.

X Int. 346. Do not leaks alongside of the gate chamber have a tendency to constantly enlarge themselves by the passage of muddy and sand-washed water through them?

Ans. Slightly.

X Int. 347. (Judge Jenks, I read the following on page 17 of complainant's paper books:) "There are two important reasons; why in actual practice; why the gates should be arranged with this extra space about them; one is that there may be a margin for unequal settlement of the structure; the other is that the infiltration of sand may have some mode of being washed out, about and underneath the gates." Do you concur in the opinion?

(Objected to as immaterial.)

Ans. I do.

X Int. 348. Was not what you call the lower dam the dam next the mill a very old one?

Ans. I don't know what you call an old dam. I would say about three or four years old. It may be older; I could not say.

X Int. 349. Bear-traps dams, as originally constructed, leaked a great deal, did they not?

591 (Objected to as vague.)

Ans. All I know on that subject is what I have learned from the testimony in this case, and from what I saw in the Benezette dam, and what I have learned from drawings of the Josiah White dams in the Lehigh; they all provide for having the water very tight by having cleats above the lower gates, and the Du Bois dams are provided in addition to that with a packing strip held out by springs to prevent that leakage.

X Int. 350. You have talked about the Benezette dam, was not the leakage in this dam carried on through crevices at the sides of the leaf, from one to two, and even three inches in places, before it reached the stop?

Ans. I only saw the Benezette dam go up and down once or twice, and don't remember whether it leaks as the question suggests before it reached the cleats or the abutment walls, but I know the cleats were there to prevent leakage.

X Int. 351. Was not the leakage in the dam so great, and is it

not still so great that it requires almost all the entire quantity of water projected under the dam by one of the wickets?

Ans. I don't know.

X Int. 352. Is not the leakage in that dam, and has it not been more through the leaves than can be filled by a wicket of the size of that used in the Du Bois dam?

Ans. I don't know.

X Int. 353. Is not the crevices between the leaves of the Benezette dam and the fore bay so great as to permit sticks and boards, of at least an inch and more in thickness to get into these crevices?

Ans. I don't know. I never saw them do it.

X Int. 354. With regard to what you have said, was the Kilmer dam, did you not notice as a fact that they had nailed boards
592 on each side of the lower leaf, so as — tighten up the crevices as much as possible, at the time you were up there last November, did you not notice this as a fact?

Ans. I can't remember anything about it.

X Int. 355. Does not the jamming of logs in the chamber containing the leaves of a bear trap, sometimes break and fracture the walls, as well as the leaves themselves?

Ans. I have never seen it done.

X Int. 356. Did you not notice on the Jo Hand dam, when you were there last November, that a number of the planks on the second tier of the lower leaf were torn off and the ends of some of them projecting up?

Ans. It may have been; a number of them showed the marks of wear and tear, I saw some of them torn off.

X Int. 357. Was not the dam next to the mill one of the dams that they were in the habit of putting in bulkheads during the dry season?

Ans. No; I never seen it but once bulkheaded. The one next the town—I did see it two or three times. I have been there I suppose twenty times.

Sketch "Exhibit Tom Keen Dam Opening."

X Int. 358. State whether the opening in the lower leaf is below the lower edge of the upper leaf when the leaves are down or nearly so, as shown in your former answer, and also what distance the upper leaf overlaps the lower leaf in the Tom Keen dam at the time testified to in your former interrogatory.

Ans. I don't know how far it overlaps; I did not measure it; I looked at it from the top of the timbers on the dam, about eight feet above, but I saw the gates lying flat. The opening was below the upper leaf, and below the overlap.

X Int. 359. Did you not, in your patent as printed in Complainant's Book, on page 6 of the appendix, use these words: "If desired the discharge opening may be controlled "by a valve operated by a float"?

593 (Objected to as incompetent and irrelevant.)
Objection sustained.

X Int. 360. I think you said in answer to question put by counsel for complain-t that in order to cock the gates, it would be necessary to have the wicket so adjusted as to have an equal quantity admitted through the upper wicket as that discharged through the lower wicket, did you not?

(Objected to as the question is not qualified with reference to relief from hydrostatic pressure or with reference to keeping the dam elevated, which qualifications were contained, separately or together in the questions.)

Objection overruled.

Ans. If by the term cocking the wickets is meant to hold the dam at a fixed height, they should be so placed. That is what I said.

X Int. 361. How high do you make your orifice above overflow from the bottom of the fore bay to relieve the gates from dangerous hydrostatic pressure?

(Objected to by counsel for complainant.)
Objection sustained.

X Int. 362. I suppose there is a head of water in the pool of the dam of two feet in height above the point level of the water in the fore bay of just sufficient height to hold the bear-trap leaves to their full height against the stops, the upper wicket being open and the lower one being closed, would the hydrostatic pressure under the leaves of the dam under the conditions mentioned be equivalent to the weight of water indicated by the height of water in the pool above the height of water in the fore bay?

(Objected to by counsel for complainant.)

Ans. I don't understand the question.

X Int. 363. Suppose the water in the dam is six feet deep above the level of the gate when down, the gate being 5½ feet when at their full height; if you open the upper wicket, the lower one being closed, the leakage being equal between the upper and lower
594 gates, how high will the bear trap raise, and what amount of water will run over in depth over the comb of the dam?

(Objected to for the reason that the word leak has been used in two different significations during the taking of this testimony). (1.) To indicate the infiltration of water and loose joints. (2.) To indicate inflow and outflow when the wickets are partly open. Counsel is requested to define in which sense he uses leakage in this question before witness is required to answer.

Ans. The dam will rise to 5½ feet and there will be six inches of water running over the dam.

Recess to 2.30 p. m.

Met pursuant to adjournment.

X Int. 364. Suppose the leakage through the leaves of a bear-trap dam is equal, and that the wickets at the upper and lower end of

the fore bay are each in size 18 x 20 inches, suppose further that the bear trap, when at its full height is 5½ feet, and the water in the pool above is 5½ feet deep, just sufficient to raise the bear trap to its full height; and further, suppose the upper wicket is open and the lower one is kept closed until the bear trap has been raised to its full height of 5½ feet; suppose further, that the upper wicket continues to remain fully open, if the lower wicket is then opened so as to discharge one-half of the water it is capable of discharging, what effect would this have, if any, upon the height of water in the fore bay?

Ans. As I understand the question, it supposes double the quantity of water running into the fore bay from the quantity running out, consequently the water in the pool must rise.

X Int. 365. Who was with you at the time you visited the Kilmer bear trap last November with the master?

Ans. Mr. Fuller, Mr. T. P. Roberts, T. W. Bakewell, Mr.
595 Shannon, Judge Jenks, Mr. Patterson, and one or two laboring men.

X Int. 366. State whether or not, from the former testimony in this case and the testimony of Mr. Potter, delivered in the other suit, and from Mr. Lee's affidavits, you do not know, as a matter of fact, that just below the saw-mill is the oldest bear-trap dam on the Du Bois property, being one of, if not the one, built after the Chamber of Commerce dam?

Ans. I do not know; I was not there when any of them were built. I testified about the matter when it was fresh in my memory. I do not know whether it is the oldest or not.

X Int. 367. Did you not visit this dam with Mr. C. F. Fuller, Mr. Potter and Mr. A. Y. Lee in January and February, 1886, and did you not have Mr. Potter examined with regard to that in February, 1888, in the other case, and how old a dam it was at the time you and Mr. Potter made the visit?

Ans. I remember we were up there, but the details of what we saw are obscure in my mind. I do not remember whether it is an old dam, or whether I saw it.

X Int. 368. When you visited and examined this old dam below and next to the mill on the occasion of the inspection tour of yourself and the master and others who were present at the time you were making this examination?

Ans. There were Mr. Bakewell, Mr. Patterson, Mr. Shannon, and I don't remember any one else.

X Int. 369. Did you notice whether any of the boards on any of the lower leaves of this dam were slimy, broken and rotten, and pieces of boards had been put on the side of the leaf next to the pier where the leakage was greatest?

Ans. I think I have all the particulars of the condition of the dam in my memorandum book which is in my office. I observed,
as far as I can recollect, that it was a dam three or four years
596 old, and had been exposed to the weather and use, but was still in workable condition. The water was flowing over and through it.

X Int. 370. Did not you and Mr. Bakewell take the wrenches that open the dam, and operate the dam, raise and lower it so as to see everything about it?

Ans. I have a confused idea that something of that kind was done. It was late in the evening, and we were in a hurry for supper.

X Int. 371. Did you or one of your companions take a heavy log hook with a long handle, shove it down with great force on the oldest side of the lower leaf where the leakage was coming up, until you produced a greater opening when the flow of water perceptibly increased after the hook was pulled out of the hole by you, so that the leakage alongside of the leaf as this increased, spurted over the leaf about one foot, by you or your assistant?

Ans. No, sir.

X Int. 372. Have you had any practical experience in working, building or contracting for building for bear-trap dams of any kind of such size as to be intended or used for actual, practical work?

Ans. No.

Redirect:

R. D. Int. 373. You have stated in the course of your cross-examination, that you observed the opening in the Tom Keen dam, of which opening an exhibit sketch has been offered, from a point some ten feet above said opening, did you take any other means than sight to ascertain the size of the opening?

(Objected to.)

Ans. Yes. I stood on the top of the dam, and felt the opening with a fence board down to the bottom through the opening, and the water was running over the dam about six inches. The length of the board was sixteen feet, I presume, the board was six or seven inches in width by one and a quarter inches in thickness.

597 R. D. Int. 374. Did you feel the length of the opening?

(Same objection continued.)

Ans. We moved the board up and down showing that it was about a foot.

ARTHUR KIRK.

Time for plaintiffs closing *their* case in rebuttal extended until March 23d, 1889, inclusive.

Adjourned to meet on Wednesday, March 20th, 1889, at White Haven, Luzerne Co., at Exchange hotel, at 10 o'clock a. m.

And now, March 20th, 1889, met at White Haven, Lucerne Co., Pa., pursuant to adjournment.

Present: Same counsel as before.

Counsel for complainant reserving all objections as to the immateriality and irrelevancy of testimony of Lehigh bear traps, examines the following witnesses concerning said bear traps.

(Objected to by counsel for defendant.)

Testimony of Samuel Hayes.

SAMUEL HAYES, duly sworn, called in behalf of plaintiff in rebuttal.

Examined by W. L. PIERCE, Esq.:

I am 63 years of age; residence, Blakeslee, Monroe Co., Pa.

Int. 375. How long have you lived in the Lehigh valley?

Ans. I was born on the Lehigh, and have been here ever since.

Int. 376. Have you known of the three dams, one, two and the Pine Forrest dam, all between Stoddartsville and Wright's creek, and if so, how long?

Ans. They were built when I was a boy, and I have
598 known them ever since; I attended the dams there sometimes.

Int. 377. Are they all destroyed now?

Ans. Yes.

Int. 378. How many of these three dams, if any, had bear-trap gates?

Ans. The three dams had bear-trap gates.

Int. 379. Were the bear-trap gates in each of the three dams substantially alike or not?

Ans. I think they were all built on the one plan.

Int. 380. Were the gates about the same size or not?

Ans. I think they were of the same size and of the same width.

Int. 381. About how wide were they?

Ans. I think about 16 or 18 feet in width.

Int. 382. Was there a flume or fore bay on each of these bear-trap dams to let the water under the leaves and out again?

Ans. Yes.

Int. 383. How was the water let into the flume and out again?

Ans. By wickets.

Int. 384. How would you raise the leaves of the bear trap?

Ans. With water.

Int. 385. To raise the leaves, how would you fix the wickets?

(Objected to by counsel for defendant.)

Ans. When you wanted to raise the leaves you would shut the lower wicket and open the upper one.

Int. 386. Did you or not ever know of the bear trap being kept up with both wickets open, and being run in that condition?

(Objected to as incompetent and irrelevant.)

Ans. I don't remember of ever seeing it done, and don't see how it could be done.

599 Int. 387. What stops were used, if any, on these bear traps to prevent the gates rising beyond a certain point?

Ans. There were stops, one on the upper gate, on the under side of the gate; then there were stops on the side of the flume where the gate rested against when it came up. I think there were stops on

the upper and lower gates. These stops on the side of the flumes were timbers, two or three inches thick spiked on the side of the flume or chute so that when the gates came up they would stop.

Int. 388. When the gates were up to their full height, which was higher *than* the top of the gates or the comb of the dam?

Ans. I think that the gate, when up, was about three or four inches above the comb of the dam.

Int. 399. How often did you pass through these bear traps, or by them?

Ans. I did not follow the river steady, but used to follow it once in awhile. I have frequently seen them.

Int. 390. Have you seen them a hundred times?

Ans. I have.

Int. 391. Were you not a raftsman on the Lehigh during the time the bear-trap gates were here?

Ans. Different times I was.

Int. 392. Was, or was not, the purpose of these bear-trap gates to raise artificial floods when there was not sufficient natural water in the Lehigh?

Ans. Yes, sir; that is what they were built for.

Int. 393. When the natural water was high enough to flow over the comb of the dam six inches deep, would these gates be needed or not to raise an artificial flood?

Ans. Yes, it would take more water than that to run rafts.

Int. 394. About how much water running over the comb of the dam would you consider a sufficient natural flood for rafting on the Lehigh?

600 Ans. Well, I should judge it would take about 18 inches.

Int. 395. What was the total length from shore to shore of each of these dams, including the bear trap, and the embankments that were built to hold the water?

Ans. Well, I should say there was quite an embankment on each side of these dams, on one side or the other; the whole dam embankments and all was about 300 or 350 feet. They were all about the same size, I think.

Cross-examination:

X Int. 396. What was the width of the comb of the dam from the embankment to the bear trap?

Ans. I should judge about 75 or 80 feet?

X Int. 397. Were the leaves of these dams strong enough to resist the pressure, and did you ever know of a case where the leaves were broken apart?

(Objected to as irrelevant.)

Ans. I never did. I suppose the leaves were strong enough.

X Int. 398. A boy could attend them or not?

(Objected to, for the reason that the character of the attendance was not specified, and that the mere attendance to raise and lower the dams to pass rafts of logs is entirely irrelevant to this case.)

Ans. A small boy 12 or 14 years of age could attend them; it was a very easy matter.

X Int. 399. You may state whether you ever run lumber after night?

Ans. No, sir.

X Int. 400. Then the dams needed no attention at night?

(Objected to by counsel for plaintiff, as entirely irrelevant whether these dams required attention at night, as it is not pretended that they used a relieving device, further than the comb of the dam constituted one.)

601 Ans. They did not need attention at night.

X Int. 401. What attention did you give these dams when you were attending them, and at what intervals, and how long at a time?

Ans. I never attended long at a time. I never made a business of attending these gates—sometimes the raftmen would let the gates down themselves and run over them, and then they would have a man go in the evening and shut them again.

X Int. 402. Do you remember how high the bear trap was when up. I mean the gates?

Ans. I think about 8 feet.

X Int. 403. The gates stood as long as the breast of the dam, did they not?

Ans. Yes, sir. The gate after the dam was gone—was left there. The freshet of 1862 carried away the breast of the dams, but left the bear-trap gates of dam No. 2.

X Int. 404. When the water was running over the breast of the dam, were not the gates of the bear trap always up, when the water was running 18 inches over the breast of the dam?

Ans. The gates would be up if the water was running over the dam that high.

X Int. 405. Did you ever make any particular experiment with the wickets with regard to their power in controlling the dams?

Ans. I never did.

X Int. 406. Did you ever see any person experiment with the wickets?

Ans. I never did.

X Int. 407. In your testimony in the other case you state that it was dam No. 1 in which the gates were left after the flood of 1862 took out the dams, and now you state it was No. 2, which is the correct answer?

Ans. It was dam No. 2. If I said it was dam No. 1, I was mistaken. I don't think I said dam No. 1.

SAMUEL HAYES.

602 *Testimony of Bradley Childs.*

BRADLEY CHILDS, duly sworn, called on part of plaintiff in rebuttal:

My residence is White Haven; I have been a lumberman here formerly; my age is 69.

Int. 408. Were you familiar with dams No. 1, 2 and the Pine Forrest dam on the Lehigh, between Stoddartsville and Wright's creek?

Ans. I was familiar with these dams, and was familiar with the place before the dams were built. I saw frequently the erection or construction of one of these dams. It was only a short distance from where I lived at the time.

Int. 409. Each of these dams had bear-trap gates?

Ans. Yes, sir; what they termed bear-trap gates at that time.

Int. 410. About what was the width of these bear-trap gates?

Ans. My recollection is that they were about 16 feet in width. They may have been a little more or less. The exact width I never knew.

Int. 411. Was there a flume at the side with a wicket or wickets to admit and discharge the water beneath the gates?

Ans. There was at all three of those according to my recollection.

Int. 412. When the bear-trap gates were fully up, which was higher the top of the gates or the comb of the dam?

Ans. My impression is that there was a little difference. The gates were a few inches higher than the breast of the dam, but I have seen the water running over the dam and gates at the same time in ordinary water. I mean natural water.

603 Int. 413. What was the total width of the gates, the comb of the dam, and the embankments from shore to shore, to the best of your recollection. I do not ask for exact figures—referring to the three dams, 1, 2 and the Pine Forest dam?

Ans. That, I am unable to say. I never knew. One may be longer than the other. They were built according to the situation where they were built. I could not give you any idea whether they were 300, 200 or 100 feet. I think they were not less than 100 feet, but probably more. At one dam there was quite a long earth embankment. The one below Stoddartsville had a very long earth embankment to the end of the dam, and so high as never to overflow.

Int. 414. What stops were used to prevent the gates rising beyond a certain point?

Ans. There was a strip at the upper end on the under side of the upper gates. There may have been strips on the side walls of the dam, chute or lock, but I don't know.

Int. 415. When the gates were fully up, have you ever seen them operate, or left standing with both the upper and lower wickets open?

Ans. No, sir.

Int. 416. How frequently have you seen these gates referred to?

Ans. I have known of the gates from a boy.

Int. 417. I show you model, and ask if it is substantially correct in showing the flume, the wickets, and the manner of introducing water under the leaves?

Ans. I think it is. It illustrates the general principle. Of course, this is not constructed to represent a fac-simile of the dams, but I don't recollect about the cleats being on the side walls of the dam chute.

Cross-examination:

X Int. 418. But you do recollect about the cleats at the
604 under side of the upper gate against which the lower gate came when it reached its full height, against which the lower gate came, and against which it was stopped when it came to its full height?

Ans. Yes. I remember about these cleats.

X Int. 419. You never attended the dams?

Ans. I never did.

X Int. 420. It is a good number of years since you saw these dams?

Ans. Yes, sir. They have not been in existence since 1862. They were destroyed in 1862.

X Int. 421. The flood was so high and violent that it tore everything out in the stream?

Ans. It tore everything out of the stream except the three dams at the town here. It tore nearly everything out down to Easton, the mouth of this run.

X Int. 422. The bear trap with its stops was strong enough to withstand all the pressure that was brought against them, on these dams which you have been speaking about in Stoddartsville?

(Objected to as improper cross-examination, and further, that the witness has not been qualified as an expert.)

(Objection sustained.)

X Int. 423. These bear-trap leaves were a part of the chute of the dam, were they not?

Ans. Yes, they were.

X Int. 424. Can you tell us how high these leaves were when they were fully elevated—the bear-trap leaves at Stoddartsville?

Ans. They were not 12 feet high. I don't think that either of the dams were over 10 feet. One was in the neighborhood of 10 feet; the other two, the upper and lower ones were, I think, about 7 feet high. I never knew the exact height.

BRADLY CHILDS.

605 *Testimony of Jackson Nogle.*

JACKSON NOGLE, duly sworn, called on the part of plaintiff in rebuttal.

I live in White Haven, am 63 years of age.

Int. 425. Have you been acquainted with dams Nos. 1, 2, and

Pine Forest dam, on the Lehigh between Stoddartsville and Wright's creek.

Ans. Very well acquainted with the first two dams, and passed through the other one frequently.

Int. 426. How did it happen that you are so well acquainted with these dams?

Ans. I was there when they were built; I was a boy then, and was around there a good deal. I am speaking of the first two dams. My uncle hauled the timber for these dams. In late years after they were built I was also familiar with them. I lived only a short distance from the first dam, and I used frequently to get there. Often I would open the wickets to let them down. I used to help to run rafts through the dams.

Int. 427. How long have you lived on the Lehigh?

Ans. Ever since I was born, here and at other places along the Lehigh river, within five miles of the Lehigh river.

Int. 428. Were the bear-trap gates on each of these three dams about the same width, or not?

Ans. About the same; I don't think there was any difference in the width of them.

Int. 429. What was the width of the bear-trap gates, to the best of your recollection?

Ans. I should think about 16 feet. They might have been a little wider or not.

Int. 430. What kind of stops were on these gates, if any?

606 Ans. There were stops of wood on the side of the chute.

Int. 431. Was there any other stops beside the side stops on the gates?

Ans. On the upper gates there was a piece of timber (on the under side of the upper gate) against which the lower gate came and stopped it.

Int. 432. Were these three dams, including the embankments from shore to shore, substantially the same width?

Ans. I don't know.

Int. 433. Were each or any of these dams including the embankments, over three hundred feet in width, to the best of your recollection?

Ans. I think that dam No. 2, including the embankments, would reach more than 300 feet.

Int. 434. What about dam No. 1 and the Pine Forrest dam?

Ans. I can't tell much about Pine Forrest dam; dam No. 1 did not have as long an embankment, but I don't think there was much difference between this dam and dam No. 2.

Int. 435. When the gates were full up against the stops, in dams 1 and 2, which was higher the top of the gates or the comb of the dam?

Ans. If I am not mistaken the gates was higher; I am positive that the water would run over the dam before it would run over the gate.

Int. 436. Have you seen these bear-trap gates after being raised a hundred times?

Ans. Yes, I think so; perhaps more.

Int. 437. When so raised and standing, have you ever seen them left with both the upper and lower wickets open?

Ans. Not that I know of; I don't think I ever saw them in that shape. My impression is that it would not stand.

607 (Last part of the answer objected to as not responsive to question.)

Cross-examination:

X Int. 438. Did you ever make any particular exhibit with the wickets, with regard to the power to control the dam?

Ans. When I was there I did it more for amusement than for anything else, to see the gates go up and down. I had no business there.

X Int. 439. Did you put them clear up, or did you when you were thus playing with the wickets, put the gates clear up every time, or frequently raise them a little and then let them down?

Ans. Sometimes I have put them clear up; other times they would not go clear up.

JACKSON NOGLE.

Testimony of Jacob Blakeslee.

JACOB BLAKESLEE, duly sworn, called on behalf of plaintiff in rebuttal.

I am 66 years of age; reside in Blakeslee, Monroe county, which is about three miles from the junction of the Lehigh and Tobyhanna rivers. Blakeslee, where I reside, is on the Eastern and Wilkesbarre turnpike.

Int. 440. How many years have you been a lumberman and raftsman?

Ans. From the time I was a boy 15 or 16 years of age until the present time.

Int. 441. How long have you known dams No. 1 and 2, and Pine Forrest dam on the Lehigh, between Stoddartsville and Wright's creek?

Ans. I have known them ever since they were built, and knew the ground before the time. (The two dams, No. 1 and 2.)

608 Int. 442. Are they washed away now?

Ans. I think they are. The two upper ones were substantially washed out. I have not seen the Pine Forest dam since the freshet of 1862. The dams were washed out at that time by that freshet.

Int. 443. How wide were the bear-trap gates in each of these dams?

Ans. It runs in my mind that they were 18 feet. They may have been 20 feet; I have run 16-foot ratts through them.

Int. 444. Were these three dams about the same length from shore to shore?

Ans. The two upper ones had both long embankments, and I think would have been about the same length. Now, the Pine Forrest dam, in the wood and cribbing was larger than in the dams in No. 1 and 2, but the other ones had longer embankments.

Int. 445. Give, to the best of your recollection, in round numbers, the length of each of these dams, including bear-trap gates, dam proper and embankments?

Ans. I can't give it in exact figures. I would suppose the two upper ones were from 300 to 350 feet long, including embankments, dams and gates. The Pine Forrest dam, I would suppose, was 200 feet and more in length.

Int. 446. How did the top of the gate, when fully up, compare in height with the breast or comb of the dam?

Ans. It was a little higher, from four to six inches; the water always ran over the dam first before it ran over the gates.

Int. 447. What, if any stops, were used on these bear traps?

Ans. I think there was a strip on the side and a piece on the under side of the upper gate, against which the lower gate would sometimes crack, and the water would force it up.

Int. 448. Was there a strip on each side?

609 Ans. I think there was; I could hardly tell whether above or below which of the gates the strip was.

Int. 449. Did you ever see the gates when in a raised position and with both wickets, the upper and lower, open at the same time?

Ans. I don't know that I ever did. It may have been but I never went and looked at it.

Cross-examination:

X Int. 450. Could you not control the movements perfectly by the use of the wickets?

(Objected to as improper cross-examination.)
(Objection sustained.)

X Int. 451. State the height of the gates when fully raised.

Ans. I would suppose the upper one was about seven or eight feet in height, the second one ten or twelve, the Pine Forrest dam about seven or eight, like the upper one.

X Int. 452. You would not pretend to give the number of inches that the top of the bear-trap gate when fully up was above the comb of the dam?

Ans. I could not.

X Int. 453. You did say that you saw the water running over the front or comb of the dam before it was high enough to run over the gates?

Ans. I did. It always ran over the comb of the dam before it ran over the gates.

X Int. 454. You can state how high you have seen the water running over both the comb and the top of the gates?

Ans. It is hard to tell. I have seen big floods go over the dam and some over the gates, too, but could not tell how deep it was.

X Int. 455. You are not certain as to the length of the dams

and embankments; now you may state what they might have been?

610 Ans. The two upper ones—dams and embankments altogether, may have been four or five hundred feet, and I think likely they were. I have walked both of the embankments and they are quite a distance. The Pine Forrest I think is just about as I stated before.

X Int. 486. How thick or wide out from the wall were these stops you speak of?

Ans. They could not have been over two-inch plank.

X Int. 457. State whether or not in your former testimony in answer to interrogatory 10 as follows: "State whether or not there were stops on the side of the leaves." Ans. "Well, I can do that; there were pieces on the side that ran down, which this upper gate came up against both sides; then also there was a strip along under, that this upper gate came up under," is this testimony correct; and if not, state what you meant to answer to that question.

Ans. The first part is right; the latter part should be that there was a strip under the upper gate against which the under gate came. That is what I meant.

X Int. 458. State whether or not when the gate came up against the stops that you have described, they were held by them.

Ans. They stopped there when they came against these stops.

X Int. 459. You may state whether or not, when the dams that you have spoken of were washed out by the freshet of 1862, the bear-trap gates or lock remained after the freshet had torn out the present dams and embankments.

Ans. The upper one stood, that was the only one that I was at. The bear-trap gates stood.

Redirect:

R. D. Int. 460. Was the bear-trap gate raised at the upper dam when the freshet of 1862 swept out the breast of the dam?

Ans. I could not tell.

611 Recross-examination:

R. X Int. 461. Were not the bear-trap leaves part of the dam, that part you call the chute of the dam?

Ans. Yes, they were part of the dam.

JACOB BLAKESLEE.

Attest: S. H. SHANNON, *Master.*

Adjourned to meet at Du Bois, Clearfield Co., on Friday, March 22d, 1889, at 10 o'clock a. m.

And now, Friday, March 22d, 1889, met at Du Bois, pursuant to adjournment.

Present: Same counsel as before.

Counsel for complainant, reserving all objections which were made at the conclusion of defendant's testimony, calls C. F. Fuller in rebuttal.

Testimony of C. F. Fuller.

C. F. FULLER, duly sworn, called for plaintiff in rebuttal:

Int. 462. State whether the Tom Keen dam, during a sudden rainstorm in the month of June, six or seven years ago, had its embankments washed out, leaving the bear trap standing, that is the old Tom Keen dam.

Ans. It did.

Int. 463. State whether the dam at that time had any means of reducing pressure and height of the water in the fore bay.

Ans. The lower end of the fore bay was cut off just even with the top of the leaves of the dam when up. Mr. Gray did it. I was not there when it was finished; I was away.

Int. 464. Were the bear-trap leaves fully up when the embankments were washed away?

Ans. They were. The dam and all was out of sight—covered with water. The flood was a kind of a water spout. The water
612 washed out a portion of the plank road between this and town. I think the flood above referred to was in the last of July or fore part of August instead of June.

Int. 465. Is it not true that during the year 1888 and thus far in 1889 that the leakage at the Kilmer dam through the lower leaf and between the lower leaf and the walls of the chute has been so great that with both wickets closed the dam would fall as we saw it do this morning?

(Objected to by counsel for defendant as opening a new question of infringement.)

Counsel for complainant proposes to prove, among other things, that the defendant has continued his infringement on the Kilmer dam since the injunction was granted in this case.

Offered admitted; the master reserving the right to strike out all testimony admitted under this offer, as it introduces a new matter of infringement.

(Question also objected to as leading.)

Ans. The dam never would fall with those pieces off on the upper leaf that I took off this morning.

Int. 466. Would it not, and did it not fall from leakage and with both wickets closed, when the pieces were on the upper leaf, as we found them this morning when we went to the dam?

Ans. It did this morning, and that is the first time I ever tried it with these pieces on.

Int. 467. After removing the pieces from the upper leaf did it not rise by leakage through the upper leaf alone in the dam chamber with both wickets closed?

Ans. It did.

Int. 468. State what pieces have been kept on both upper or lower leaves in the season of 1888 on this dam.

Ans. Just as we saw it there. I am speaking of the pieces on the

upper leaf. They were put on in the fall after the log-driving was done, and done while we were experimenting with the dam.

613 Int. 469. Why were the strips put on the upper leaf, and what purpose did they accomplish?

Ans. The pieces were put on there by order of Judge Jenks. He said he wanted to stop all leakage coming in from the upper gate as was possible, so he could experiment with Mr. Kirk's hole in the wall.

Int. 470. Was there any dry season during the running of the big mill in 1888, if so, state the length, the two dams below the mill were bulkheaded.

Ans. They were bulkheaded, but I could not state the time that it was done. I could not state the time they were put on, they were there until fall. I should think they were on for more than a month. They might have been on for three or four months; I could not give you the number of months. They were on late in the fall when I commenced to build the new dam.

Int. 471. Was not the dry season last year, considering the large amount of water that fell, shorter or at least as short as the average dry season?

Ans. During last season there was more rain than what we have had for quite awhile, especially the latter part; I think it is the wettest fall that I have ever seen.

Int. 472. In your former testimony before the master I believe you have stated that you had full opportunity to observe all the workings of the dam, is this not so?

Ans. Yes, I have had full opportunity.

Int. 473. Please explain how and why, when the dam is raised to the full height against the stops, that if both wickets be closed the water in the fore bay will sink below the level of the water in the pool when apparently there is no leakage out of the fore bay?

(The former objection to question now renewed.)

Same ruling on this question as before.

Ans. It is caused by the leakage through the leaves of the dam. Just what you see today. That is the only way I have to account for it.

614 Int. 474. At what height on the lower leaf is the leakage just referred to?

Ans. It generally leaks from the top of the chamber, under the dam, from the top to the bottom, all along where you see those cracks, caused by the unevenness of the walls of the dam.

Int. 475. How far did the water in the fore bay in the new dam below the mill sink this afternoon, with both wickets and the dam fully up against the stops below the level of the upper pool, and the water running six or eight inches over the comb of the dam?

Ans. I did not measure; I never measured it.

Int. 476. Is it not a fact that you have observed that the fall of water in the fore bay, under the condition you have stated, continues only for about a few seconds after the wickets have been closed?

(Same objection renewed.)

Ans. It falls to the level of the top of the chamber under the leaves of the dam. It takes a short time. I never timed it.

Int. 477. If the water falls only to the level of the top of the leaf chamber, and the fall is solely occasioned by leakage in the lower leaf of the dam, must not the only leakage points be as high as the top of the leaf chamber?

(Same objection renewed, and also because the witness has already answered the question.)

Int. 478. In other words, must not the water fall to the level of the leakage point?

(Same objection renewed, also that question is leading.)

Ans. The dam leaks all up and down the guard-wall. You can't make them tight, and have them work.

Int. 479. Why does not the water fall to the level of the lowest leakage point in the lower leaf?

Ans. Because it is supplied by leakage from the upper leaf.

Int. 480. How does it happen that you have the leak-
615 age from the upper leaf so exactly balanced with the leakage through the lower leaf that the water in the fore bay, under the conditions above stated, invariably falls to one and the same point, that is the top of the leaf chamber?

(Model of bear trap produced and shown witness.)

Ans. That fore bay will drop as I have explained it to you there, so that the upper leaf will sag down enough from the upper cleats to admit a supply of water to equalize the leakage on the lower leaves. You may call it automatic.

Int. 481. Did you not state, in answer to the former question, that the upper leaf sagged a one-half inch, more or less? I ask for an answer, yes or no.

(Objected to as a cross-examination of the plaintiff's own witness, and for the reason that it is an attempt to use an explanation which had only been given for the benefit of all parties before his answer had been made.)

Ans. I never measured it in my life. I said, sir, it might have been a half an inch, more or less.

Int. 482. Do you know what wages were paid the creekmen in the year 1888?

(Objected to.)

Ans. I do not know of my own knowledge.

Int. 483. Did or did not you and Mr. John Du Bois, as partially appears from your testimony in this case, experiment with floats as a means of regulating the wickets of bear-trap dams, and did you or not as partially appears from your testimony abandon such floats as unsuccessful?

Ans. We experimented with floats and found them successful on all but one dam.

Int. 484. Did you or not, testify during the original case that you and Mr. John Du Bois abandoned the use of floats because they were unsuccessful?

Ans. I don't know how I testified then, but we abandoned one float, the float at the Chamber of Commerce dam.

Int. 485. Since the injunction on December 31, 1887, on
616 how many bear-trap dams on the Du Bois property have you observed that the water in the fore bay remains lower than the water in the upper pool when the dams are fully up against the stops?

Ans. Five, just what we saw today. The names of the dams are: the two dams at the mill, the Jo Hand, the Tom Keen, and the Kilmer dam.

Int. 486. Which of these dams, if any, were put in since Jan. 1, 1888, and if so, when?

Ans. The new dam at the mill. It was put in late in the fall of 1888. It was not used that season. Never was used until this spring.

Int. 487. What person at Du Bois can swear of his own knowledge to the following facts, or is most likely to be competent to swear to the following facts: (1) What were the wages of the creekmen in 1888, (2) what was the approximate length of the dry season in 1888?

(Objected to as incompetent and irrelevant.)

Ans. I presume Mr. John Horner and the creekmen can tell you all about it.

Int. 488. Has it, or not, happened during the dry seasons of past years, that occasionally thunder storms, or cloud bursts have occurred which have suddenly raised the Sandy Lick creek to flood height?

Ans. We have thunder showers that raised the creek a little, but hardly ever happened to raise the bank full.

Cross-examination:

Subject to all of objections made by counsel for defendant at commencement of direct examination.

X Int. 489. Mr. Fuller, does it not happen that in consequence of the lowness of the bottom lands, the many bayous, the number of swamps, the crookedness of the stream, the number of logs laying upon the bottom lands, and the underbrush growing thereon, and the breadth of the bottom lands laying on the Sandy lick, between Du Bois and what is called the big dam, that when
617 there is about 4½ feet or 5 feet of water in the stream, that along the creek the waters are very slow in their movement, and overflow the bottom lands, and thus become an expansion water of great width.

Ans. The water is slow in the stream at all stages of water, but

more so when the banks are overflowed. It overflows at some places at lower stages than others, the banks would go from 4 to 5 feet and more. In other places it might not be 4 feet.

X Int. 490. Your attention has been called to the Kilmer dam, you can state now as a fact, whether that dam has not been kept uniformly in as good, practical form and condition and working order as its age, the condition of the material, the seasons of the year would permit?

Ans. It has been kept in repairs, and as reasonably as it could be done.

X Int. 491. State when you nailed up the fore bay of that dam (Kilmer dam) from that time until the present, you have not in good faith kept the crevices alongside the leaves in such condition as to keep the dam in good, reasonable, practicable working order.

Ans. Yes, sir.

X Int. 492. You can state whether there is any more leakage in that dam through the leaves thereof, than you have observed in all bear-trap dams previous to year 1879?

Ans. When the Kilmer dam was built, the leakage was much less than what it is now; the age of a dam, the wear and tear from driving logs, and the effects of the frost, settling of abutments, being jammed by logs, causes it to leak more and more each year while used?

X Int. 493. You may state whether some degree of leakage is not incident to every bear-trap dam along the leaves?

Ans. I never saw a bear-trap dam without more or less leakage along the leaves.

618 X Int. 494. You can state whether you did not take means by putting boards at the lower leaf at that dam and tighten it up as much as you could for practical use at this dam, and at all other bear-trap dams?

Ans. We did build all dams, and make them as tight to prevent leakage on the lower leaf as we possibly can, and allow them to work, and keep them, and have kept them that way.

X Int. 495. State how the leakage at the lower leaf of the Kilmer dam compares with the leakage out of the lower leaves of the Chamber of Commerce dam in 1879?

Ans. The leakage of the Chamber of Commerce dam was more than what it is in the Kilmer dam today.

X Int. 496. State when, if you remember, the bear-trap dam at Benezette was built, how old it is.

Ans. I could not say. More than ten years old; I have known it for 13 years.

X Int. 497. State what is the leakage of the lower leaf of the Benezette dam as compared with the Kilmer dam.

(Objected to for the reason that the age of the Benezette dam is not made a condition of the question, and that by the witness' own testimony the leakage of bear-trap dams varied with age.)

Ans. It is very much more.

(Counsel for defendant, under same objection as stated at commencement of examination of this witness, makes the following statement, that the wages paid each creekman known as log-drivers, etc., was the same in 1888 as that paid for their services in the year 1887.)

And now, Saturday, March 23d, 1889, parties met pursuant to adjournment.

(Counsel for defendant objects to this statement as a statement of defendant, same being furnished at the request of complainant's counsel, and is subject to same objection as above stated.)

619 X Int. 499. You have stated that there was a very great flood on the Luthersburg branch of the Sandy Lick creek some six or seven years ago, caused by a water spout which washed away some of the embankment of the old Tom Keen dam, built by one Wm. Gray; you also stated that the water covered the bottom lands adjoining, and was so high as to leave only a small part of the wicket leaves out of the water, and that the leaves of the dam were at the same time elevated to their full height; you also stated that when the flood passed by that the dam itself remained standing as to its leaves and was uninjured; have I thus stated correctly the purport of your testimony?

Ans. The dam proper was uninjured and the purport of the testimony was correctly stated.

X Int. 500. You put in the Kilmer dam at the time it was built, what are called packing strips to tighten the lower leaves?

Ans. I did.

X Int. 501. That leaf was made as tight as was at all practical consistant with the use of the leaves of the dam?

(Objected to as mere reiteration of witness' cross-examination.)

Ans. That dam was built that way.

X Int. 502. Please state whether you went on the lower leaf of the Kilmer dam yesterday, and in presence of the master, and of the counsel and the plaintiff, with an ordinary two-foot rule in your hand, made an examination by probing of the size of the crevice or crack at the side of the lower leaf, and what you found to be the condition of the crevice as to its size.

Ans. I did, and I found the timber of the dam about from a half to three-quarters of an inch from one of the guard-wall-. I found the packing strip on the under side of that timber close up to the wall. What we call the covering of the dam was close up to the other side of the guard-wall of the dam.

620 X Int. 503. The packing strip was so close against the wall that you could not push the edge of your rule through, could you?

Ans. You could not.

X Int. 504. State how thick that rule is.

Ans. About $\frac{3}{16}$ of an inch.

X Int. 505. You made the same examination as to the Tom Keen

dam, and you find that the packing strip on each side of this was close up to the walls of the dam?

Ans. Yes, sir, I did and found it the same.

X Int. 506. You did go down to and make an examination of the Benezette dam this spring, and at other times?

Ans. I did.

X Int. 507. You found this spring, and at other times, that the crack at the sides of the lower leaf of said last-named dam, on each side was at least as it appeared to you for a greater part of the length of the leaf from one to two inches in size?

Ans. I just judge from what I saw from the top of the dam looking down that the crack was from one to two inches along the side of the lower leaf, that is in spots and spaces.

X Int. 508. That dam is much more substantially built than the Kilmer or any other bear-trap dam on the Du Bois property?

Ans. What I could learn about it, it was built much stronger.

X Int. 509. There was no packing strip on the old Jo Hand dam, or the Chamber of Commerce dam?

Ans. Not as I know of.

X Int. 510. Nor was there any used on any of the dams on this property, prior to the year 1881?

Ans. None with packing strips prior to the year 1881.

X Int. 511. A new dam can be make tighter in its construction than can an old one by repairs, can it not?

Ans. This qu[illegible]ion is pretty broad.

X Int. 512. A new dam can be made tighter in its con-
621 struction than can an old one by repairs, unless the repairs are very costly, and radical in their character, and then it is patch-work, and not of the same practical value as work entirely new.

Ans. A new dam can be made tighter and cheaper than what an old one can be rigged up and put in the same repair, the same working repair—you cannot make new lumber out of old.

X Int. 513. The boards on the side of the upper leaf were put on the Kilmer dam after the log-driving season was over, after the master came up in the fall?

Ans. I think it was as late as in November, and after the master was there, and after the log-driving season was over.

Redirect:

R. D. Int. 514. How frequently have you visited the Benezette dam?

Ans. I was there three times in 1888. I was once there this spring '89. I have been at this dam lots of times in the last twelve years. I have been there a great many times.

R. D. Int. 515. You know all about this dam then?

Ans. This question is very broad.

R. D. Int. 516. You are thoroughly familiar with this dam?

Ans. I am familiar with the workings of this dam.

R. D. Int. 517. Was or was not the lower leaf of this dam swept down-stream once or twice?

(Objected to as incompetent and irrelevant, and not cross-examination.)

Ans. All I know about it is from hearsay, and that was from the complainant, Mr. Kirk.

R. D. Int. 518. Did or did not the dams at Benezette have side stops or cleats on their lower leaves?

Ans. They did when I last saw them.

622 R. D. Int. 519. How far did these side stops overlap the edges of the lower leaf—what distance did they extend up and down?

Ans. There was some of these stops ran the whole length of the leaves—not the whole length, but about four or five feet from the upper leaf so as to allow the leaves to overlap.

R. D. Int. 520. Did you or not put side stops over the lower leaf of the two bear-trap dams or either at Caledonia?

(Objected to as incompetent and irrelevant).

Ans. Upon the leaf of the dam at Caledonia. There is a long stop above and a short one below. The stop below is on the top of the apron.

R. D. Int. 521. Is it not the case that occasionally during the dry season the water in the creek on the Du Bois property where these dams are situated is raised by rainstorms to such a height that it flows over the leaves of the bear-trap dams when up?

Ans. Most assuredly, if we leave the dam set up long enough for the pools to raise to the top of the leaves of said dams. It will do so in any ordinary water.

R. D. Int. 522. Were there any overflows on the dams at Benezette, or were the lower wall of the fore bay cut down lower than the top of the leaf chamber.

Ans. As I understand these dams, there is about 200 feet of a fore bay. I call the breast of the dam the fore bay. It operates and acts in my opinion as a fore bay. I saw that dam up; the water was flowing over the breast of the dam, and it lacked about 18 inches of going over the top of the leaves of the bear-trap gate.

R. D. Int. 523. When bear-trap gates are pressed up firmly against side stops by the pressure of water underneath, there is comparatively very little leakage around the sides of the leaf. Is there or not, assuming that the side stops and leaves and chutes are properly constructed?

Ans. There is not much leakage.

623 R. D. Int. 524. What is the length of the side strip compared with the length of the upper leaf which we saw at the Kilmer dam yesterday?

Ans. It was exactly the length of the upper leaf when I put it on. That I am certain.

R. D. Int. 525. Were, or not, these side strips on both sides of the upper leaf?

Ans. Yes, sir.

R. D. Int. 526. On how many of the five bear-trap dams, now the

subject of controversy, have you put on the side strip on the upper leaf?

Ans. One beside the Kilmer dam, the new dam at the mill.

R. D. Int. 527. What are the dimensions of the side strips on the Kilmer dam and on the dam below the mill, on the upper leaf, the width and thickness of the Kilmer, and the length, width and thickness of the strip, at dam at the mill?

Ans. I never measured them. The strip is somewhere near an inch at the upper end, and it runs down to about an eighth of an inch to the lower end. It is sawed what we call wedge, wedge shape. Its width is from five to eight inches. The strips at the new dam at the mill are the same substantially in width, length and thickness.

Recross-examination:

(Subject to all former objections.)

R. X Int. 528. The side strips spoken of that you put on the new dam finished late last fall, was put on to complete the dam, the opening at the side of the upper leaf having been made much larger on this dam than on any dam previously constructed?

Ans. Yes.

R. X Int. 529. When there is a flood in the stream, and the bear-trap leaves on the Sandy lick, on the Du Bois property, are
624 elevated, and the water is running over them to any considerable extent, the bottom lands are overflowed and then become a great wasteway?

Ans. Yes, sir.

R. X Int. 530. You may state at one time you remember, about a year ago this spring, that the Jo Hand dam leaves were up to their full height and there was a flood which covered the leaves and the bottom lands, and the Jo Hand leaves were found sufficient to maintain themselves and resist all hydrostatic pressure; is this not true?

Ans. They did, and this is true.

R. X Int. 531. The Benezette dam is about 14 feet high when elevated, is it not—that is the bear trap?

Ans. Along there somewhere.

R. X Int. 531½. The wasteway or breast of the dam is now a hundred or more feet in length.

Ans. I never measured it. It might be more or less.

R. X Int. 532. This breast of the dam and wasteway, when not in any way closed by brackets, is from six to ten or twelve feet below the top of the leaves when elevated?

A. That is to the best of my knowledge.

R. X Int. 533. The Caledonia dam east of the mountains and not on the Du Bois property, and as also the Benezette and White river?

Ans. They are east of the mountains, and on the Bennett's branch or tributary of the Susquehanna river, and not on the Du Bois property.

(Counsel for defendant renews the objection at commencement of this witness, this objection to apply to all questions and answers, as if made at the time the questions were put and answers were made.)

C. F. FULLER.

625 *Testimony of John Horner.*

Mr. JOHN HORNER, duly sworn, called on part of plaintiff.

Int. 534. What was the extent of the dry season in the year 1888?

(Same objection made to this witness as to the testimony of C. F. Fuller.)

Ans. I can't state positively. I would think from the 1st of August, and continued for about two months.

Int. 535. Would two months safely represent the extreme limit of the dry season for the year 1888?

Ans. I could not state any more definite than my former answer. It might have been more. This dry season refers to filling the dams from the supply held in the Tunnel dam.

Int 536. How long were the dams at the mill bulkheaded in the year 1888? Give such a length of time as will safely cover the longest probable period?

Ans. They were bulkheaded from the time we started the mill on April 4, and continued so until the season closed in the fall. Both dams were bulkheaded.

Cross-examination:

X Int. 537. When you speak of the dams being bulkheaded, you mean that for practical purposes they were closed during the whole time.

Ans. Yes, sir. They were practically closed, and only opened temporarily. The temporary openings would be the exceptions.

JOHN HORNER.

(Counsel for defendant renews the same objection as made at commencement of the examination of Mr. Fuller, the objection to apply to all questions and answers as if made at the time the question was put and the answer made.).

Adjourned to meet at Pittsburgh, on Tuesday, April 9th, 1889, at 2 o'clock p. m.

626 And now, Tuesday, April 9th, 1889, met at Du Bois, the hearing having been adjourned from Pittsburgh to Du Bois, at request of plaintiff, and without the consent and under protest of T. H. Baird Patterson, attorney for defendant.

Plaintiff's Testimony in Rebuttal.

Testimony of this witness objected to by counsel for defendant as incompetent and irrelevant, and not proper subject-matter in rebuttal, and should have been given by plaintiff in this case in chief.

Mr. C. F. FULLER, recalled by plaintiff in rebuttal.

Examined by W. L. PIERCE, Esq.:

Int. 538. State whether or not, Jo Hand dam within the last month on the lower end wall of the fore bay, there have been three movable boards working in slides, covering an opening cut through the lower fore-bay wall, each board having two projecting bolts, one substantially at each end, adapted to be raised and lowered by means of poles or strips having a hole bored therein, to slip over said bolts—is this substantially correct, or not?

Ans. Nearly so.

Int. 539. In what particular or particulars, are the statements in the above question incorrect?

Ans. You may call it correct. There are three boards with bolts in the end that work in a slot.

Int. 540. By whom was this movable gate or movable boards put upon the dam?

Ans. They were put in by the order of Judge Jenks.

Int. 541. When?

Ans. I could not say correctly, it was late last fall.

Int. 542. Have they been used since then?

Ans. In no way but in experimenting with the dam.

Int. 543. In what experiments, and for what purpose were they used?

627 Ans. To see what amount of water was required to hold the gates up.

Int. 544. How long has the opening covered by one or all of these strips been left open?

Ans. I never knew of their being removed, except while I was there with the judge, experimenting with the dams. I never found them off when I was along there.

Int. 545. Why was it necessary for you to find out how much water was necessary to support the leaves of the dam, as you have testified that this was the purpose for which these strips were put in?

(Objected to as incompetent and irrelevant.)

Ans. I don't know. It was done under Judge Jenks' order.

Int. 546. What other of the following five dams, if any, have similar strips, either movable separately, or bolted together, and covering an opening in the lower fore-bay walls, to wit: Kilmer dam, Tom Keen, Jo Hand, and the two dams below the mill?

Ans. There are none of them that had similar devices now; we had a hole in the lower-end fore bay at the Kilmer dam experimenting the same was as at this one, but it is now closed up, or was closed up a short time ago.

Int. 547. Why was it necessary for you to experiment on two dams? Why were not the results at the Jo Hand dam sufficient to determine the amount of water necessary to hold up the gates?

Ans. We experimented on the Kilmer dam at first. It was too far away; we closed it up and came down to the Jo Hand.

Int. 548. Is it, or not, a fact that upon many, if not on all occasions, when the complainant or his counsel are expected to visit these dams in controversy, that some one or other has gone ahead and had the dams raised before the complainant or his counsel could reach it?

628 Ans. I never knew of such being done. You may have found the dams up yesterday, as our men were all on the creek yesterday driving longs. You will find them driving today.

Int. 549. Do you, or not, know whether the fact of the complainant or counsel expecting to arrive here yesterday afternoon, was telegraphed in advance to Du Bois, and whether orders were given to station a man at each dam in advance of the arrival at the dam of complainant or his counsel?

(Objected to by counsel for defendant as incompetent and irrelevant.)

Ans. Judge Jenks showed me a dispatch that Mr. Kirk, the master and counsel, would be up here on Monday. I asked him whether they would be up before evening, he said perhaps not, and he wanted me to fix my business so that I could be here Tuesday morning. That is all I know about it.

Int. 550. Since the date of the injunction, Dec. 31, 1887, will you state to us in detail every method, device, system and appliance by which any of the five dams now in controversy have been operated, whether it was by means of cocking the wickets, by means of leakage, by the renewal of strips, by the taking off of side stops, or by any openings of any kind or character whatsoever, which have been made in the leaf chamber, walls of the dam, walls of the fore bay, or any other of the working parts of the dam, or by any means whatsoever omitted in the statement of the above question?

(Counsel for complainant asks this question for the purpose of showing how the defendant has worked his dam since the period of the injunction, and if deemed expedient, to make a claim of infringement during the year 1888.)

(Objected to by counsel for defendant because the question is vague, and so sweeping and general in its terms as to be improper, also, for the reason that in so far, that it is intended to lay

629 the basis for a further or new claim of infringement other than that put in in their case-in-chief, it is objected to as not competent in rebuttal, and because attempting to take testimony on questions not submitted to witness.)

(Objection overruled with reserving the right to strike out all testimony under or above offered.)

Ans. Nothing has been used but the wickets, except what was used on the fore bay experimentally with these two dams. Judge

Jenks experimented with his float on that dam (Jo Hand dam). We also experimented with Mr. Kirk's hole in the wall in the Kilmer dam. The strips on the Kilmer dam on the upper leaf were also put on to tighten the dam for experimenting with the dam.

Int. 551. In your former answer immediately preceding, you say that nothing but the wickets have been used to operate the five dams in issue, since the date of the injunction, will you state in detail, just what use has been made of these wickets in the following operations:

1st, of raising the dams.

2d, of maintaining the dams at any fixed height after it had been raised.

3d, in lowering the dam.

Ans. We open the upper wicket and close the lower one to raise the dam. We shut the upper one and open the lower one to lower the dams. To maintain the dam at a fixed height, I would say we can pull the gates to admit a certain amount of water, and we let out water at the lower wicket to equalize what comes in at the upper. That will hold the gate at a given point that you want.

Int. 552. How do you determine the exact degree to which both wickets shall be opened, so that the inflow will just equal the outflow and the dam remain at a fixed height?

(Objected to as incompetent and irrelevant, and further, by T. H. Baird Patterson, Esq., for the reason that the conditions
630 are not stated and would vary with the stage of water and velocity, and with the season at the particular moment at which the experimental use of cocking the wicket is made.)

Ans. We get at that when the dam becomes stationary. We know then that the wickets are all right.

Int. 553. Do you mean then or not that you experimentally move the upper and lower wickets down and up until you got them in such relative positions that the dam leaves are still and at the required height?

Ans. As I said before, we move the wickets until the dam becomes stationary. The question states the answer substantially correct.

Int. 554. Is this the only position of the wickets in which the dam will remain stationary at a fixed height, and will not the dam remain stationary at a fixed height with both wickets closed?

Ans. The dam will stand up against the stops with both wickets closed.

Int. 555. Is this true on all five of the dams now in issue?

Ans. I presume some of them will drop, perhaps half an inch more or less, and then they will come up again; just as I explained by the model at the other hearing.

Int. 556. In your answer before the last, when you were asked whether the dam would remain at any fixed height with both wickets closed, you say that they will stand up against the stops with both

wickets closed; will it stand at any other desired position with both wickets closed?

Ans. I never found them so to do.

Int. 557. Now, if the leaves of the dam will stand up against the stops or substantially so, with both upper and lower wickets shut, what effect upon maintaining the leaves of the dam in position after they are up against the stops, do the wickets have? Do they have any effect at all?

Ans. The wickets have to have an effect, because they hold the water under the dam and in the fore bay.

631 Int. 558. For the purpose of maintaining the dam in position only when it is once up against the stops, the wicket could be thrown away and the upper and lower fore bay walls built solid, could they or not?

Ans. In our dams they could be, that is the Du Bois dams. They must have, however, a supply of water from above to keep the dam full.

Int. 559. In your former testimony, taken at the last meeting, you stated among other matters, that you had observed at all the five dams now in issue and since December 31, 1887, that when the dams are up against the stops, or substantially so, with both wickets closed that the water in the fore bay was lower and continued lower than the level of the water in the upper pool, will you give the reason or reasons why this is so?

Ans. I have given this reason two or three times. I would have to have the model here to explain this. I will explain it, however, in my own way. When the dam comes up firmly against the stops it cuts off a certain supply of leakage from the upper gate; therefore, the water will lower in the fore bay until it gets down to such a point that the upper leaf will drop enough to admit water in. This is as near as I can explain it now. The water has to get so that it will equalize itself.

Int. 560. Is it, or not, the fact that the reason why the water sinks in the fore bay at first, and as soon as the valves are shut is on account of the leakage through the lower fore-bay wall, or through or around the lower leaf of the dam.

(Objected to as leading by counsel for defendant.)

Ans. That is so when the dam is up tight against the stop.

Int. 561. Is this first leakage out of the fore bay ever fully compensated, and is it, or not, a fact that even after the admission of water into the fore bay and leaf chamber by reason of the sag-

632 ging of the upper leaf, that the level of the water in the fore bay remains permanently lower than the water in the upper pool?

Ans. It remains lower with both wickets closed.

(All the foregoing testimony taken under the objection stated in commencement of examination that the testimony is not proper subject-matter of rebuttal.)

Cross-examination by Judge JENKS:

Cross-examination subject to same objection as not proper matter in rebuttal.

X Int. 562. At every experiment made with this dam, on either the Kilmer or Jo Hand, as far as you remember, Mr. Kirk's copy of patent and testimony was taken up and the request was made to make the experiment honestly and in good faith, to arrive at the truth and nothing but the truth, relative to the height of water under the leaves of the dam that was required to raise the leaves of the dam; and also the height of water required to hold them to their full height, and was not particularly there not read from Mr. Kirk's testimony the following words on page 115 (Plaintiff's Paper Book): I first thought of doing that by a special chamber at the end of the dam for that purpose, connected with the space under the dam by means of an opening at the bottom of the end wall, but finding that would involve unnecessary expense, I gave the preference to another plan, viz.: by actual experiment, find the elevation of water under the dam necessary to support it to the desired height, then by simply cutting an opening at that height between the chamber under the dam, when raised, and the tail race, necessary in all these dams to carry off the water from under the dam, when it was desired to lower the dam; I say, by simply making an opening between these two chambers of the same capacity of the inlet valve, which, when opened, permitted the water to get under the dam; I concluded it would be impossible for any damage to be done to the dam, by the carelessness of the tender, or other causes per-
633 mitting the inlet gate to remain open; I also had an idea of accomplishing the object by means of floats, levers, etc.

(Plaintiff's counsel objects to all cross-examination in regard to experiments made since the date of the infringement or injunction, except so far as such cross-examination is based upon the examination-in-chief just concluded, and to show simply whether or not the movable gates were put into the dams as a matter of experiment or every-day use, and the further objection is made that the experiments referred to were made under a grotesque misconception of the description of the scope and claims of the Kirk patent, and were, therefore, entirely irrelevant.)

(Objection overruled.)

Ans. This was correct.

X Int. 563. The opening you refer to in your first answer, made in the end wall of the fore bay of the Jo Hand dam, was made for the sole purposes of experiment?

Ans. It was.

X Int. 564. State whether the boards were put in the orifice and kept in it from the time of experiment last fall until the 25th of March, 1889, when you went with Mr. Woodrig & Hinds to examine the dams?

Ans. They were.

X Int. 565. At that time all the boards necessary to close the ori-

fice were there in the orifice and did actually close the orifices, and were used to close it when we left the ground on the 25th of March?

Ans. They were on, and the orifice closed with the boards on that day. We could not use the dam without having the orifice closed.

X Int. 566. The experiment in the Jo Hand dam was made late last fall, and the orifice closed up and left closed when the experiment ended?

Ans. Yes, sir; and the dam left down, and left down all winter.

X Int. 567. When we made the experiment in the presence
634 of Mr. Woodrig and Hinds, the orifice was closed up and left closed up, is this not so?

Ans. Yes, sir.

X Int. 568. Turn your attention to the Kilmer dam; in every instance when the experiment terminated, the orifice made in the side of the leaf chamber, as well as the orifice made in the lower end wall of the fore bay, were fully closed up and left closed up? Is this not so?

Ans. Always so.

X Int. 569. You closed up last fall, or early part of winter, permanently the orifice made in the wall of the leaf chamber at the Kilmer dam?

Ans. Yes, sir. It was closed up permanentiy.

X Int. 570. You also left closed up the orifice made in the end wall of the Kilmer dam?

Ans. Yes, sir.

X Int. 571. Is it not a fact, Mr. Fuller, that on every occasion on which Mr. Kirk, or his counsel *expected* the dams, and when they were actually here every means in our power were afforded, even to the furnishing of teams to haul them to the dams, except at the last visit, when the roads were so bad, and the teams were in the woods, so that we could not furnish them with teams?

Ans. Yes, sir.

X Int. 572. There has never been any means taken to conceal anything from Mr. Kirk or his counsel, to your knowledge, has there?

Ans. Never. I have showed them everything in my power.

X Int. 573. You have neither added to, nor taken from the dams anything save by way of experiment, whatever, and they have always been kept with the overflows closed since December, 1887? and there is no leakage created or known save what is the usual result with such dams, and used as they are to drive logs; if any extraordinary leakage exists, it is simply accidental, and does
635 not exist by creation or design, and the general leakage is less in the dams now operated on the Du Bois property since 1883, than it was in the same kind of dams, and of the same age operated on the Du Bois property, prior to 1884?

(Objected to as irrelevant by counsel for complainant.)

Ans. I have not added anything to, nor taken from the dams anything, save by way of experiment; and the overflows, have been kept closed since December, 1887, and there is no other leakage

created or known to exist save that which results from the use of the dams, none other, and there is no leakage, either by creation or design, save the actual wear and tear. Our design is to keep the dam tight as possible, and allow them to work, and there is less leakage now in the dams since 1883 than prior to 1884.

X Int. 574. The men by their experience have learned and do cock the dams very quickly and accurately?

Ans. Yes, sir; they do.

X Int. 574½. You already stated in substance, if not in terms, that after the dam has been raised to its full height by opening the upper wicket and closing the lower one, that it will remain stationary if there is a sufficient pool of water above, and the water from that pool continues to pass through the upper leaf in greater quantities, or is equal to that passing out through the lower leaf or crevices that may be below the upper leaf?

Ans. The dam will remain up under these conditions.

X Int. 575. When the discharge of water through the lower leaf is greater than the amount coming in under the leaves of the dam from the upper pool through the upper leaf, the leaves of the dam will fall?

Ans. Yes, sir.

X Int. 576. The lower wicket, or wickets, when closed, are those which hold the water in the fore bay above and under the leaves of the dam, after it has been introduced into the fore bay and
636 under the leaves by the opening of the upper wicket or wickets; the lower wickets are the discharging wickets, are they not?

Ans. Such is the case. The lower wickets are the discharging wickets.

X Int. 577. Question by counsel for plaintiff referred to as follows: "For the purpose of maintaining the dam in position only when it is once up against the stops, the wickets could be thrown away and the upper and lower fore-bay walls built solid?" And you answer as follows: "In our dams they could be, that is the Du Bois dams. They must have, however, a supply of water from above to keep the dams full." In this, your answer, you refer exclusively to the dams used on the Du Bois property?

Ans. Yes, sir, I do; I suppose the question referred to this.

Redirect:

R. D. Int. 578. In your answer, in which you say that the purpose of retaining the dam leaves in position after once that the wickets might be thrown away and the upper and lower end walls built, etc., why do you limit this answer to the dams built on the Du Bois property, and why could not this be done on any other bear-trap dams?

Ans. The reason is I never tried it on any other dams but dams on the Du Bois property.

R. D. Int. 579. Do you know of any positive reason why it would not work on any other bear-trap dams, and if so, what reason?

(Objected to as incompetent and irrelevant.)

Ans. I do not know why it would not work on other bear-trap dams built as these are, under the same stage of water. This is as near as I can answer.

R. D. Int, 580. What is there peculiar in the construction or situation of the Du Bois bear-trap dams, which enables you to operate them in the above manner?

637 Ans. They are kept in better repair, and less leakage from leaves than any other bear-trap dams that I have examined away from the Du Bois property.

Recross-examination:

R. X. Int. 581. These Du Bois dams are all small ones and low, and the water sluggish, and in their construction and position in the stream, they may and do differ from other dams of the same kind that you have examined in other streams. Is this not so?

Ans. Yes, sir.

C. F. FULLER.

C. F. FULLER recalled on part of plaintiff:

Int. 582. Are you familiar with the construction of the Brookville dam?

Ans. I am not.

Int. 583. Do you or not know whether the Brookville dam has side stops on the walls of the chute above the lower leaf?

Ans. I do not.

C. F. FULLER.

Adjourned to meet on Tuesday, April 9th, 1889, at Caledonia, Elk Co., at — o'clock p. m.

638 And now, Tuesday, April 9th, 1889, met at Caledonia, Elk Co., pursuant to adjournment.

Present: Same counsel as before.

(Testimony of this witness objected to by counsel for defendant as incompetent and irrelevant and not proper rebuttal, and should have been offered by plaintiff in his case-in-chief.)

Mr. JOHN KRAUSE, recalled by plaintiff in rebuttal. Examination by W. L. PIERCE, Esq.

Int. 584. You are the same Mr. Krause who has testified before in this case?

Ans. I am.

Int. 585. Has any accident happened to the Caledonia dam since you testified in Pittsburgh in this case?

Ans. Yes, sir.

Int. 586. What is it?

Ans. The dam went out.

Int. 587. What part of the dam?

Ans. The lower leaf of one of the gates.

Int. 587½. Which gate?

Ans. The one nearest the mill.

Int. 588. When did this gate go out?

Ans. The 26th of March, 1889.

Int. 589. How did the stage of water on the 25th day of March, above the dam, compare with the stage of water today at the same place?

Ans. There was more water then than there is today.

Int. 590. Much more water?

Ans. There was just a common flood.

Int. 591. What do you mean by a common flood?

Ans. I do not know what to say to that.

Int. 592. Do you or not mean such a height of water as frequently happens in this stream?

Ans. Yes, sir.

Int. 593. Was or was not the dam up when it went out?

639 Ans. I was not at the dam, but it was up.

Int. 594. What change, if any, had been made on the lower leaf or upon the apron a short time before the dam went out?

Ans. They cut the third apron off.

Int. 595. How many days about before the dam went out was the third apron cut off?

Ans. I don't remember the days, but it went out shortly after.

Int. 596. Have you looked at the leaf or gate since it went out?

Ans. Yes, sir; I have.

Int. 597. Was it or not broken?

Ans. Yes, sir.

Int. 598. State where it was broken?

Ans. It was broke in the middle.

Int. 599. Do you mean by this or not, half way from end to end across the stream?

Ans. Yes, sir; it was broken that way.

Int. 700. What parts of it were broken?

Ans. I saw the timber broke.

Int. 601. How many timbers ran across the length of the gate?

Ans. Three timbers.

Int. 602. And how many of these were broken?

Ans. I don't know, but I think they were all broke from the looks of it.

Int. 603. What is the size of these timbers?

Ans. I am not sure, but think they are 10 x 12 inches.

Int. 604. How about the planking, did you notice that?

Ans. I don't know what size they are.

Int. 605. Did you notice whether the planking was broken after the dam went out?

Ans. I did not notice.

640 Cross-examination.

Examined by Judge JENKS:

(Examination subject to same objection as before.)

X Int. 606. How wide is the leaf of this dam?

Ans. I think about 44 feet. I am not sure.
X Int. 607. There were only three pieces of timber across it?
Ans. That was all I could see.
X — 608. The dam was built in the summer of 1882?
Ans. I think so.
X Int. 609. It was a pretty old dam for a bear trap, was it not?

(Objected to as incompetent and irrelevant as the witness has shown no experience as to the life or probable duration of bear-trap dams.)

Ans. I don't know how old these dams get.
X Int. 610. The leaves had not been in good order during the winter, and there was difficulty in raising them, was there not?
Ans. Yes, sir.
X Int. 611. Who was tending the dam the day it went out?
Ans. Ira Cochran.
X Int. 612. Who else?
Ans. Mr. Layberger was there, but don't know who was tending it.
X Int. 613. Who else was there?
Ans. I don't know.
X Int. 614. Was not there another man there?
Ans. I don't know.
X Int. 615. What time of day did it go out?
Ans. In the afternoon about 3 o'clock.
X Int. 616. There is another dam alongside of it, is there not?
Ans. There is another gate there.
641 X Int. 617. How wide is that gate?
Ans. I never measured it; about 44 feet I have heard them say.
X Int. 618. It was always sufficient to stand, was it not?
Ans. Yes, sir.
X Int. 619. The running of logs broke the chute of the other dam below the leaf, did it not, very much?

(Objected to as incompetent and irrelevant by counsel for plaintiff.)

Ans. I seen a hole there, I didn't know what broke it, I suppose it was logs.
X Int. 620. A pretty big hole, was it not?

(Same objection.)

Ans. A good-sized hole.
X Int. 621. The timber composing that part of the chute is much thicker and heavier than that part composing the planking of the leaf that went out?

(Objected to.)

Ans. Yes, sir; they are heavier.
X Int. 622. It is a very common thing for chutes of these dams

to be very much shattered by ice and logs running over them. Is this not so?

(Objected to by counsel for plaintiff.)

Ans. Yes, sir.

X Int. 623. Very few dams stand six years without being much shattered where there are very many logs driven over them?

(Objected to for the reason that the witness so far has shown no experience sufficient to qualify him to answer such a general question.)

Ans. I don't know.

X Int. 624. There has been a very great many logs run over this dam since 1882, until the spring; has there not?

Ans. Yes, sir.

642 X Int. 625. You have seen logs gorge in the pool above this dam, have you not?

Ans. I never seen them go over one on top of another. I don't understand this gorging.

X Int. 626. The leaf of this dam was subjected to all the usages that caused the chute below to be broken, was it not?

Ans. I don't understand that question.

X Int. 627. Did not the same amount of logs, and the same amount of ice pass in the same manner, which resulted in breaking the chute below, pass over this leaf that passed over the chute?

Ans. Yes, sir.

X Int. 628. Then it has for the space of about six years been subjected to the same hardship, pressure or strain as the chute below?

Ans. Yes, sir.

X Int. 629. Did they run more logs over this side of the dam than they did on the other on account of the wickets working easier?

Ans. I think they have.

X Int. 630. How high was this dam when up to its full height?

Ans. I don't know exactly.

X Int. 631. State as near as you can.

Ans. Six or seven feet, I suppose.

X Int. 632. They have had more trouble with the leaf on this side than on the other on account of its defects in its construction or weakness of the leaf?

Ans. As to the first part of the question, I answer yes, and the same as to the last part.

X Int. 633. Was not substantially all the log-driving done over and through the leaf that went out this spring?

Ans. The most of it was done on that side.

X Int. 634. Who attended this dam, principally for the last four years?

643 Ans. Mr. Layberger and Mr. Fausse.

X Int. 635. How many feet higher was the flood that swept the leaf out than the present stage of water?

Ans. I don't know how many feet higher.

X Int. 636. These timbers that you speak of were simply stretched across the leaf without any bracing timbers whatever; is this not so?

Ans. I don't know.

Redirect examination:

R. D. Int. 637. Was there an apron reaching half way over the lower leaf which would save it so far from hurt from passing logs and ice?

Ans. Yes, sir, there was an apron; yes, it would save it.

R. D. Int. 638. Did you ever see on the leaf that was swept out any important breaks which had been made by ice or logs?

Ans. Yes, sir, it is broke in two.

R. D. Int. 639. In your last answer do you or not mean the break which was made when the dam was swept out?

(Objected to as leading, and also for the reason, unless he made a personal inspection of the timbers under the leaf, at what time the break occurred.)

Ans. I don't understand this.

R. D. Int. 640. Did you ever see on this leaf any important breaks made by ice or logs before the leaf was swept out?

Ans. I don't mind as I did.

R. D. Int. 641. When you said that the leaf was broke in two, were you or not speaking of the break which is now in the leaf, and which was made by the dam sweeping out?

(Objection continued as on page 13—, and further it assumes
644 as a fact that has not been stated before that breaks in timber was made before the leaf was swept out.)

Ans. Yes, sir.

Recross-examination:

R. X Int. 642. Did you examine the leaf to find whether the breakage was from above or below, that is, was it toward the planking or from the planking?

Ans. I don't know how it was broken.

Redirect:

R. D. Int. 643. Were there, or not, any logs or ice running over the dam at the time the dam was up, and just before the dam went out, or were the logs lying quietly in the pool in still water?

(Objected to as leading and improper in form.)

Ans. I don't know; I was not there.

R. D. Int. 644. Do you remember any great windstorm on the day the dam went out?

Ans. No, sir.

JOHN KRAUSE.

645 *Testimony of J. W. Guthrie.*

J. W. GUTHRIE, duly sworn, called by plaintiff in rebuttal, examined by W. L. PIERCE, Esq.

Same objection made to testimony of this witness as to the testimony of John Krause by counsel for defendant.

My occupation now is milling. I am foreman at Caledonia sawmill.

(Same objection.)

Int. 645. Did you ever make any examination of the leaf of the Caledonia dam that was swept out when it was lying down in the stream?

Ans. Yes, sir.

Int. 646. How long was it that you did this after the gate was swept out?

Ans. That same afternoon or the next morning. I would not be positive which.

Int. 647. What was the size of the cross-beams that ran from one end of the gate to the other?

Ans. I think they are 12 x 12 inches.

Int. 648. Did you notice the soundness of those cross-beams?

Ans. Yes, sir.

Int. 649. Were they not sound except the break in the middle of each timber?

Ans. Yes, sir; they were sound, with the exception of the break; it was a fresh break.

Int. 650. Did you notice the soundness of the planking, so far as it could be seen?

Ans. Yes, sir.

Int. 651. What was its condition except the break in the middle?

Ans. It was good.

646 Cross-examination by Judge JENKS, under same objection as before:

X Int. 652. What was the length of these beams?

Ans. I think they were about 40 feet, I never measured them.

X Int. 653. They were not braced in any manner?

Ans. I know nothing about the dam.

X Int. 654. Was there any cross-timbers?

Ans. I did not see any.

X Int. 655. You don't know whether the break was made by pressing under or by falling on the water below?

Ans. No, sir.

Redirect:

R. D. Int. 656. When did you come to the Caledonia sawmill?

Ans. March 5, 1889. J. W. GUTHRIE.

647 *Testimony of Ira Cochran.*

IRA COCHRAN, duly sworn, called by plaintiff in rebuttal.

Examined by W. L. PIERCE, Esq.:

(Same objection renewed as to former witnesses examined at this hearing.)

I am 35 years of age, and I live at Caledonia.

Int. 657. How long have you worked at the mill?

Ans. I never worked much at the mill.

Int. 658. How long have you worked at or near the Caledonia dam?

Ans. I have been around about four or five years.

Int. 659. Where were you when the leaf swept out on the 26th of last March?

Ans. I was on the bank, this end of the dam, next the mill.

Int. 660. What was the stage of the water that day at this dam?

Ans. It was just an ordinary stage of water.

Cross-examination under same objection as before.

Examined by Judge JENKS:

X Int. 661. You saw the dam go out.

Ans. Yes, sir.

We offer on cross-examination to prove by this witness his knowledge of the dam, his familiarity with it, as to its situation, and when it was swept out.

(Offer admitted.)

X Int. 662. Was the water high enough to run over what is called Kirk's overflow at the time the dam went out?

Ans. I don't know what his overflow is. I could not say; I was not out to the gates, and could not say.

X Int. 663. Was Kirk's or any overflow open at that time as the dam went out; and if so, was the water high enough at that time to flow over or through such overflow?

648 (Objected to by counsel for plaintiff as improper cross-examination, and for the further reason that the witness has not shown any familarity with Kirk's overflow, or that he knew anything about Kirk's overflow.)

(Objection overruled for the present.)

Ans. There was an overflow partly open. I could not say whether the water was running through or not; I didn't look.

X Int. 664. With relation to the leaves of the bear trap when up, how high was the water when the leaf went out, if you remember?

Ans. The water was just about nearly running over there.

X Int. 665. Was the overflow you have referred to on that dam above or below the comb of the leaves of the bear-trap dam when fully up, and if so, how much, and was the water running over or through such overflow.

(Objected to as improper cross-examination and for the further reason that the witness has already stated that he was not at the gate while the water was running over the overflow or not, and that the latter part of the question is a mere repetition of the question already asked and already answered.)

Ans. Well, I could not tell whether it was above or below; I never viewed it, or took a close look at it; I am only guessing at it.

I. N. COCHRAN.

All the foregoing testimony of complainant's testimony at this hearing objected to by counsel for defendant as incompetent and irrelevant, and for the reason that the dam in regard to which this testimony relates is of a different construction and differently situated, and subjected to different conditions from those on the Du Bois property, and those on the Lehigh with regard to which defendant offered testimony.

649 Adjourned to meet at Caledonia, Wednesday, April 10, 1889, at 8 o'clock a. m.

Adjourned to Du Bois, April 10, 1889.

Testimony of D. W. Sparks.

D. W. SPARKS, duly sworn, called on the part of plaintiff in rebuttal:

Examined by W. L. PIERCE:

(Objected to by counsel for defendant as incompetent and irrelevant, and as not proper rebuttal, and for the further reason that it attempts to introduce a new subject-matter of infringement.)

I live in Du Bois, and keep a livery stable. I was born in 1850.

Int. 666. State whether you visited the Kilmer dam with Mr. Arthur Kirk this afternoon.

Ans. I did.

Int. 667. What was the elevation of the dam up or down?

Ans. The dam was up.

Int. 668. What was the position of the wickets, closed or open?

Ans. Both wickets were closed.

Int. 669. Were they not both locked?

Ans. There were locks on them, but I did not examine them.

Int. 670. Did you notice any discharge of water in the bottom of the fore bay into the stream below?

Ans. There was some.

Int. 671. What did you do to ascertain where the opening was from which the water came?

Ans. I stuck my fingers in to feel the force of the water.

650 Int. 672. Where did you find the opening to be with reference to the cross-beam which supports the lever that operates the lower wicket?

Ans. Under the beam.

Int. 673. Immediately under or at some distance from the beam?

Ans. Right under the beam.

Int. 674. How far along the opening through which the water was coming, did you feel?

Ans. I felt about a foot in length.

Int. 675. How wide was the opening at the outside of the lower fore-bay wall, I mean up and down?

Ans. I don't know whether it was that way or not. I think it was the other way.

Int. 676. How long was this opening from right to left as you faced the lower fore-bay wall?

Ans. It looked to be about 20 inches. I should judge from 18 to 20 inches. I did not measure it.

Int. 677. Now what was the other dimension of the opening from the bottom of the beam down?

Ans. I don't understand the question.

Int. 678. What was the thickness of the crevice?

Ans. Three-eighth- to a half inch.

Int. 679. Was the portion of crevice which you did not feel thicker or narrower than the portion which you did feel?

Ans. Well, that would be pretty hard for me to tell, only from the looks of the water coming down.

Int. 680. Which part of the crevice did you feel, the part toward the shore or the dam?

Ans. The part toward the dam.

Int. 681. What part of the crevice was discharging most water, the part toward the shore or the part toward the dam? Where was the thickest stream?

Ans. It looked to be towards the shore?

Int. 682. Why didn't you feel the whole crevice with your hands?

651 Ans. I did not want to get wet.

Int. 683. What was the amount of water coming out of this crevice?

Ans. I could not tell.

Int. 684. You have stated that this crevice was (without measuring) about 18 to 20 inches long, and from three-eighth- to one-half inch thick, was the water discharging through this whole crevice; in other words, in a stream approximately 18 x 20 inches in length, and three-eighth- to one-half inches thick?

Ans. It looked to be a sheet of water from the crack or crevice. It might be a large crack or small one.

Int. 685. Did, or did not, the water discharging from this crevice have a considerable head, and shoot out a foot or two from the lower fore-bay wall?

Ans. I should judge it did, without measuring it.

Int. 686. Did this crack appear to extend directly through the lower fore-bay wall, or to make a turn and extend either up or down?

Ans. It seemed to extend across.

Int. 687. You do not understand my question; I mean this, when

you put your hand in this crack did you strike an obstruction behind?

Ans. There was an obstruction, that would be my answer to that.

Int. 688. Did, or did not, the crack extend directly through the lower fore-bay wall, or did it strike this obstruction and then turn either up or down; in other words, was there a straight opening right through the lower fore-bay wall into the fore bay?

Ans. I could not see that.

(Cross-examination under objection as above.)

Examination by Judge JENKS:

X Int. 689. Did not that which you call a crack come from a want of closing the wicket tightly?

652 (Model shown witness.)

Ans. I could not tell.

X Int. 690. Would not this account for it?

Ans. It looks as though it would.

X Int. 691. Then the crack was at the lower end of the fore bay, about the place the upper side of the lower wicket would close?

Ans. I could not tell. Perhaps it might be at that place; it was just under the leaves.

X Int. 692. When you put your fingers in this crack you say that there was something back in this that sloped up above the crack, was not that most likely the upper end of the wicket where it closed up against the lower end of the fore-bay wall?

Ans. It seemed to be something that stopped up there, whether it was in the wicket or the crack above the wicket, I could not tell, I could not see it. I was feeling under water.

X Int. 693. It was in the place where you would naturally look for the upper edge of the wicket, was it not?

(Model shown witness.)

Ans. I could not tell.

X Int. 694. Was it not about the place where you would look for the wicket or expect to feel the wicket, the upper edge of it?

Ans. It is pretty close to it. Perhaps maybe it was.

X Int. 695. You did not see the crack, it was under water, is that so?

Ans. No, sir; I could not see the crack. It might be full of water.

X Int. 696. The crack might have been under water, might it not?

(Objected to as indefinite by counsel for plaintiff.)

Ans. It might have been.

X Int. 697. It was either the upper edge of the wicket slightly open or a crack very close to it, was it not?

653 Ans. One or the other.

X Int. 698. You did not see it?

Ans. I did not see it?

X Int. 699. You put your hand down under the cross-beam or the lower end wall of the fore bay and felt it?

Ans. It was just below the lower cross-bar, which cross-bar is just above the wicket.

X Int. 700. A very small crack, in which you could just put a knife blade, would make quite a spurt of water, would it not?

Ans. With pressure, it would. The more pressure the more water.

X Int. 701. How high was the water in the fore bay above this crack?

Ans. I did not measure. A man would not know unless he measured it.

X Int. 702. How much higher above this crack was the water in the fore bay than was this crack, which you felt, guess the best you can?

Ans. I would guess four or five feet.

D. W. SPARKS.

Adjourned to meet at Pittsburgh, on Monday, April 15th, 1889, at 3 o'clock p. m.

654 And now, April 19th, 1889, parties met pursuant to adjournment.

Present: same counsel as before.

Mr. ARTHUR KIRK, complainant, recalled in rebuttal.

Int. 703. State whether you visited the Caledonia bear-trap dam on or about the 21st day of March, this year, being the day before the taking of certain testimony in this case at Du Bois?

(Objected to by counsel for defendant as incompetent and irrelevant, and part of plaintiff's case-in-chief, and not competent at all, because it tends to raise new questions of infringement in regard to dams not involved in this suit.)

Ans. I did.

Int. 704. What was the situation of the leaf that has since swept out, and what work was being done upon the leaf or apron that day when you were there?

Ans. It was down and at least a dozen men at work on it putting in a coffer dam immediately above it, and two or three men chopping the third leaf off; and the overflow at that time boarded up by boards (one or two) nailed across over the opening, the opening being about 10½ inches wide, the horizontal width was about 8 feet.

Int. 705. How much higher would the overflow be raised by thus closing up the opening 10½ inches in height and adding to that the cross-beam above said opening?

Ans. I think it raised it 18½ inches above what had been the overflow for some time, and it had been raised about two feet above what had been an opening for an overflow which appeared to have been made when the dam was made.

Int. 706. When, and at what hour did you leave the dam at that day?

Ans. Near five o'clock.

Int. 707. To what height do the leaves of this dam rise when fully up?

655 Ans. Seven feet.

Int. 708. How many bear-strap chutes are there in this dam?

Ans. Two.

Int. 709. What is the width of each?

Ans. 43 feet 6 inches each.

Int. 710. On what stream is this dam?

Ans. On the Bennett's branch.

Int. 711. When did you next visit this dam?

Ans. I can't remember dates. I have to refer to my diary. It was April 9th, 1889.

Int. 712. In company with whom?

Ans. In company with Judge Jenks, the master, Mr. T. B. Patterson, F. C. Fuller and W. L. Pierce.

Int. 713. What was the situation of the leaf nearest the mill, this latter visit?

Ans. It had been washed out and was lying lower side up just below the chute of the dam that it was intended to close.

Int. 714. Did you or not have a full opportunity to walk out on the leaf and inspect its condition?

Ans. I did.

Int. 715. State how the leaf is built up or constructed?

Ans. The leaf must have been constructed piece by piece in the chamber it occupied, and was built by laying three large timbers lengthways across the stream, one near the rising end of the leaf or gate was twelve by twelve inches, a very sound timber; the second one or middle timbers was ten by twelve; the third one or one nearest the hinges was eight by twelve, all very sound hemlock wood. Across them running up and down stream, first thickness of plank on the upper side was two inches thick, pine plank; this was covered by a thickness so as to break joints, or a course of pine plank four inches thick. I don't know whether the four inches

656 thickness extended the whole length or not. I don't know whether the timbers and boards were spiked or pinned; these planking were sixteen feet long.

Int. 716. Had both of the lower leaves in both chutes as originally constructed, have an overhanging, or third leaf or apron?

Ans. When I saw them some four or five years ago, they both had third leaves nine feet long, hanging down over the leaf. The far chute still has a nine-foot apron on, but the apron on the near one which overturned, they were cutting off when I visited it on the 21st. Those aprons were five or six inches thick. I could not get the exact measurement of the thickness of the aprons. These aprons were hinged with iron hinges to the top of the upper leaf.

Int. 717. When you saw the lower leaf of this chute near the

mill lying below the dam, on the 9th of April, were any of the iron or wooden parts of the leaf broken, if so, describe in detail what?

Ans. All the three main timbers were bruised at the ends, and all broken near the middle of their length, broken entirely through, and some of the iron showed marks of old breaks, but most of them were quite recent breaks.

Int. 718. Did this chute, upon which the lower leaf was washed out, have side stops, and if so, where and what dimension and timbers?

Ans. Both had side stops or cleats above the third leaf made of 9 x 4 oak, bolted strongly to the timbers on the abutment on each side, and lapped down over the apron seven feet from the comb of the dam. They were only seven feet long, and extended over the lower leaf; the four inches was that against which the leaf passed. It also had cleats of the same sized timber the whole length of the upper leaf, extending down the upper leaf from the comb of the dam, also bolted on the timbers or the abutment.

Int. 719. State whether any of the side stops in this chute were apparently moved from position or torn off when the lower leaf swept out?

657 Ans. None of them showed signs of being torn off.

Int. 720. Did you take any cuttings from the three cross-timbers or the lower leaf which was swept out, and if so, produce them, and state as near as may be, from what part of each timber with relation to each break such cuttings were taken?

Ans. I did cut them as near all as I could to the break, the breaks were in water, and I cut these three pieces one from each timber.

Marked Exhibit Cuttings from the three timbers of the leaf of the Caledonia dam that was washed out, and offered in evidence by counsel for complainant.

Int. 721. What preservative effect, if any, has water upon submerged wood?

(Objected to as the witness is not an expert, and that the leaf from which the cuttings were taken was not submerged.)

Ans. All my experience shows that wood immersed in water is practically everlasting.

Int. 722. How frequently have you visited the bear-trap dam at Brookville, built by John Du Bois, as one of his earlier dams?

(Objected to as incompetent and irrelevant, and for the same objection as to that made at the beginning of the witness' testimony in regard to the Caledonia dam.)

Ans. My first visit, I think, was in the year 1885, and I have visited them on an average of about twice a year since.

Int. 723. Are there or not side stops on the chute or chutes of this bear trap over the lower leaves; if so, state whether they are over both lower leaves and what part of the leaf do they cover?

Purpose of the offer is to show what John Du Bois thought was necessary in the construction of his dam as originally built.

(Objected to as incompetent and irrelevant by counsel for defendant, John Du Bois not being a party to this case, nor in any
658 way connected with the question involved in this case between John E. Du Bois and Arthur Kirk, as to the assessments of profits and damages, and all this being subject to the evidence offered by complainant and calculated to raise a new issue.)

Ans. There are two chutes in that dam, and the gates in both chutes are provided with cleats or stops above both upper and lower leaves, and run the whole length of the leaves; the cleats over the lower leaves have to be from two to three feet shorter than the length of the leaf to permit the upper leaf to pass in rising. These are all bolted very firmly to the timber in the abutments.

Int. 724. In your numerous trips to Du Bois, including the chamber of commerce visit as well, when did you first see or hear of cocking the wickets as a means of retaining the bear-trap dam elevated?

(Objected to as incompetent and irrelevant, and as a positive contradiction of his former testimony, and as asking for a positive contradiction of his former testimony if answered in the negative as contemplated in the question.)

Ans. I never heard of it before some time in the summer of 1888, and I never saw it done until our last visit to Du Bois, when in the presence of the master and Mr. Patterson and others, C. F. Fuller and Mr. Owen Horn, I have before this seen dams stopped partly up in order to run logs, and to show how the water could be dammed by means of a bear-trap dam, but I never seen it done or understood it to be a means of protecting a dam against the hydrostatic pressure, or from being washed out.

That portion of answer of witness as to what he understood to be the use of the wickets is improper and unseemly, as he is a party to the case, especially as it contradicts his former testimony in the case, objected to by counsel for defendant.

Int. 725. When you were last at Du Bois on April 10th, in
659 answer to a suggestion on your part as to the privilege of seeing certain dams down instead of up, what reply did Mr. John Du Bois make to you as to the number and frequency of splashes then being made?

Counsel for complainant proposes to prove by the answer of the witness that Mr. Du Bois told Mr. Kirk that they were making daily splashes with the dam or dams.

(Objected to as incompetent and irrelevant.)

Ans. He said they were constantly being used.

Int. 726. When you were at Du Bois on the 22d of March this year, the next day after one of you- visits to Caledonia, and when we all visited the five dams now in controversy, state whether the three upper ones were then or not being used for splashing, and the two lower for the creation of a pool at the mills.

Ans. I think they were.

Int. 727. Did we or not that afternoon stand at the Jo Hand dam and see a splash go through?

A. Yes, the logs were running thick through.

Int. 728. When you visited the big mill this year, on Wednesday, April 10th, were they or not having any trouble in getting upstream, and in explanation of such troubles what did Mr. Horner state was the reason of such trouble.

Counsel for complainant proposes to show by the witness' answer that on this latter date the big mill had just been started, and that there was not sufficient natural wafer from March 21st to April 10th to start the mills.

(Objected to by counsel for defendant.)

(Objection sustained.)

Int. 729. When did the big mill start at Du Bois this year?

Ans. I think it started on the 10th of April, to the best of my knowledge.

Int. 730. To your knowledge, was cocking the wickets or any relieving or open sluice extending from under the gates so as
660 to relieve them from any unnecessary pressure, used or described in any printed publication in this or any other country before the date of your invention.

(Objected to as incompetent and irrelevant, the witness' knowledge by reading or his own knowledge derived therefrom is not evidence of any fact required to be found in this issue.)

(Also, for the reason that the question is double in its character, and asks for an answer which contemplates a contradiction of witness' prior testimony.)

(Objection overruled.)

Ans. I have never heard or known of anything.

Int. 731. Can you give an approximate estimate of the average yearly thousand feet of lumber that are sluiced through the bear-trap dams?

This question — not asked for any new theory for damage or for forming a basis of damages directly, but simply and solely to show the constant use of such dams during the sawing season.

(Objected to by counsel for defendant as incompetent and irrelevant, and being a mere guess or estimate is utterly worthless as evidence.

Ans. As near as I can get information on the subject, I estimate that these dams run 25 to 30,000,000 feet. They are said to run 125,000 feet a day, and for 200 days a year makes this amount.

(Counsel for complainant, in view of the difficulty in estimating the number of million of feet of lumber passing through this stream, and in order to avoid all possible undue prejudice to the respondent from the above inquiry, requests of defendant's counsel a statement of the number of thousand feet of lumber run through this stream and over one or more of the bear-trap dams in controversy from the

17th of July, 1884, to the date of furnishing such statement, such statement to include all logs whether sawed or owned by John Du Bois or other persons.)

661 (Defendant claims the right to give evidence in surrebuttal on this point.)

Int. 732. Have you prepared any tables and drawings which illustrates the pressure in pounds on the lower leaf of bear-trap gates of different heights and comprising such pressure when used both with and without Kirk's relieving device, said relieving device being shown at arbitrary heights, but sufficientiy illustrative to afford means of comparison between dams with and without such overflow; if so, please produce them.

(Objected to by counsel for defendant as incompetent and irrelevant, as being a calculation manufactured by the complainant, without any specific data or fact upon which to base the same, and made by the complainant, who, by his own testimony is utterly incompetent as an expert, or in any other capacity, to make such a calculation as would be rebuttal, being in reality mere *ex parte* statement, and also as not rebutting testimony, for the reason that it does not contradict.)

(Objection overruled.)

Ans. I have, with great care.

Int. 733. Have you carefully compared and read these computants, and do you believe them to be correct?

(Same objection continued.)

Ans. I have, and do believe them to be correct.

Recess until 1.30 p. m.

Met after recess.

Int. 734. Have you had any photographs taken of the creek at Du Bois, showing the two methods of sluicing logs by bear-trap dams and without them, also showing the storage slip at the Du Bois mill created by the two bear-trap dams?

(Objected to as incompetent and irrelevant.)

Ans. Yes, sir; I was present when they were all taken.

Int. 735. Are they correct?

662 Ans. They are.

(Photograph offered in evidence by counsel for complainant, and it is asked that the photograph showing the logs sluiced by the bear trap be marked photograph A; and that by the drop-gate, photograph B; and that of the slip at the mill, photograph C.)

(Objected to as incompetent and irrelevant.)

(Offer admitted.)

Int. 736. Did you have a photograph taken of the float, or such portions of it as are visible from the Caledonia dam; if so, please produce it?

Ans. Yes.

Int. 737. Is it correct?

Ans. Yes.

Int. 738. In what year were all these photographs taken?

Ans. It was either in the latter part of the summer of 1887 or the first of 1888.

(Latter photograph offered in evidence and marked Exhibit D.)
(Same objection continued.)
(Offer admitted.)

Cross-examination—Mr. ARTHUR KIRK.

Examination by Judge JENKS, subject to same objections made at the commencement of the examination of this witness:

X Int. 739. Am I to understand you as stating that the overflow in the Caledonia dam, as originally made by John Du Bois, was two feet lower than the one that was subsequently made and has been used and acted upon?

Ans. I had no convenient way of measuring it, and it appeared to be about two feet square, the bottom of this opening about two feet below the bottom of the overflow that had been used. The overflow appeared to have been used for some years.

663 X Int. 740. If the overflow that you speak of as having been originally made by John Du Bois, was added to the 18-inch overflow, would that not make the overflow 42 inches deep?

Ans. I did not measure them with reference to the comb of the dam. I did not measure it. The bottom of it would be 42 inches below the top of what was the overflow before the water would run out.

X Int. 741. If the cut at the bottom of the fore bay was made 42 inches deep and 8 feet wide and were left open and continually discharging water, could the bear-trap leaves be raised with that overflow continually?

(Objected to by counsel for complainant as a supposition contrary to what the witness has just testified to that the lower opening was two feet square.)

Ans. It would depend upon the relative position of the opening to the height of the gate.

X Int. 742. Question repeated with the limitation of the opening being cut down 42 inches below the comb of the dam when elevated?

(Same objection.)

Ans. It would depend upon the proportion of the water admitted, and whether the water admitted was capable of supplying such a waste as this.

X Int. 743. Where a wasteway is of sufficient capacity to let pass by and discharge at the height of the wasteway all the water de-

scending in the stream, is not such wasteway practically the height of the dam so far as its power to detain water is concerned?

(Objected to by counsel for complainant as indefinite and liable to mislead and that the character of the dam, situation of the wasteway, the weight of the dam to be sustained, and the height of water necessary to sustain such dam are all omitted from the condition of the question.)

Ans. If the wasteway has capacity to carry off all the
664 water coming down the stream there would be none left to raise the dam.

X Int. 744. There were not any logs running through the dams except the Jo Hand dam at the time you were there on or about March 22d, the day you referred to the logs being run through the Jo Hand dam?

Ans. I think it was all.

X Int. 745. Did you tell us what means in the shape of stops John Du Bois, Sr., had used on the upper and lower leaf of the bear-trap dams at Brookville to prevent the leaves from being swept out of this place, and the lower one overturned by the hydrostatic pressure of the water?

Ans. The stops were timbers and I did not measure them, but as near as I recollect they were bolted to the side walls of the leaf chamber.

X Int. 746. The same kind of stops were used on the Caledonia dams with the difference that the stops at the Caledonia dam that protected the lower leaf from overturning merely extend from the apex of the leaf when elevated to the bottom of the apron, is this so?

Ans. Yes.

X Int. 747. If the cut of the lower end of the fore bay was made 42 inches deep below the comb of the dam when up to its full height, and the upper part of the overflow so formed was eight feet wide, and the lower two feet thereof only two feet wide, and such overflow left open and continually discharging water, could the bear-trap leaves be raised with the overflow continuing open; the overflow being of this shape?

(Objected to by counsel for complainant for the reason that sufficient limitations and conditions are not put in the question to permit the witness to give an intelligent general answer thereto.)

Ans. If there is not enough of water to raise the gates they will not rise; if there is more than to supply this waste it will rise. It will depend upon the supply of water.

665 X Int. 748. On the day you were on the Jo Hand dam when the splash went out on the 22d of March, were not the Tom Keen dam and the Kilmer dam down, or nearly down, at the time you visited them in company with the others?

Ans. They had been down that day evidently, but we found a man at each of them who had apparently gone there for the pur-

pose of raising them. It was either that day or the next day. I am a little confused as to dates.

X Int. 749. Were they not raised, or being raised, at the time you visited them that day?

Ans. I am not certain, but I think they were.

X Int. 750. Were the boards with which the two-foot overflow below the overflow of the one used later in the lower end wall of the Caledonia dam, I mean the boards with which the lower two-foot square overflow was closed up, as old or appeared as the rest of the structure in the original dam?

Ans. About the same.

Redirect:

X Int. 751. How long after the 22d of March, this year was it that you visited the Du Bois dams?

Ans. I have been there three times quite recently. In March, on April 10th, and in about the middle of the time in the interval.

R. D. Int. 752. At this intermediate visit, what dam, if any, were being used for splashing?

Ans. The Tom Keen dam had logs running over it. I don't remember any others.

The foregoing testimony objected to by counsel for defendant for reasons stated at the commencement.

ARTHUR KIRK.

666 Col. THOS. P. ROBERTS called on part of complainant in rebuttal.

Examined by W. L. PIERCE, Esq.:

Int. 753. How would you compute the hydrostatic pressure on the slanting sides of a closed vessel, when you have the height given of a column of water with which said closed vessel has full communication?

(Objected to as incompetent and irrelevant.)

Ans. I would first obtain the area of the slanting side and then the height of the column of water, and take the pressure of half the depth per square inch or square foot, multiplied into the area per the square inch or square foot.

No cross-examination.

THOMAS P. ROBERTS.

Complainant closes.

667 And now, Wednesday, April 10, 1889, met pursuant to adjournment.

Present: Same counsel as before.

Defendant's Testimony in Surrebuttal.

Testimony offered and taken by defendant in surrebuttal subject to objection by counsel for plaintiff, as incompetent and irrelevant,

and for the further reason that defendant is not entitled to offer testimony in surrebuttal; counsel for plaintiff reserving the right to move to strike out all testimony offered by defendant in surrebuttal.

Testimony admitted by master under the above objection.

WM. LAYBERGER, duly affirmed, called by defendant in surrebuttal.

Direct examination by Judge JENKS:

522.—1 Q. State who has charge of the Caledonia dam.

A. I have at the present time.

523.—2 Q. How long have you had charge of the dam?

A. I have had charge the greater part of the time in season for the last four years.

524.—3 Q. What control, if any, have you over them by use of the wickets?

Objected to as immaterial and irrelevant.

Objection sustained.

525.—4 Q. State who had control on the 26th, during the month of March, up to the time of this hearing?

A. Mr. Cochran really had control. He and I worked the gates jointly.

526.—5 Q. Was you on the dam on the 26th of March, when the gate went out?

A. I was on the dam that day.

527.—6 Q. Who was with you?

668 A. Mr. Cochran and a man named Mr. Stein and a stranger.

528.—7 Q. State what had been the situation of these gates during the month of March, and the trouble you had with them?

A. They were in a bad situation, and we had a great deal of trouble in getting them up.

529.—8 Q. Explain in detail the difficulty you had had with these gates that went out and how they acted.

A. The gates would not come up. We tried to get them up by loosing them and sawing along the side with a saw. I cast the apron off to relieve the weight on top. They did not work completely then; they worked partly. I then built a coffer dam temporarily in front of them, and they came up then. Afterwards we continued to build those coffer dams; that was not successful; the gates did not come up as they should; they came up one side at a time. On the day prior to the gates going out, I discovered that the wicket was very nearly closed. I opened the inlet, and the gates then came out. I cleaned away the rubbish and dirt that had accumulated there. About the next thing that happened, the gates kept coming up until they went out at that time.

530.—9 Q. State whether at that time you had the coffer dam in above the upper leaf?

A. Yes.

531.—10 Q. You can state whether you had let in by the upper wickets the water under the dam from the upper pool?

A. Yes.

532.—11 Q. You can state if you know anything about what was called the overflow?

A. The overflow was open, nearly all; I kicked the board off myself. This overflow was closed by two boards. I kicked one of them off entirely. I kicked the other one loose, but it still hung by one corner. The other end lay on the float in the fore bay in the other corner, subject to the action of the water. My impression is that the water came up between the loose end of this board and the overflow. This is the best answer I can give to it.

669 The latter statement of the witness is objected to by counsel for plaintiff, as it is founded simply on his impression and is not evidence.

533.—12 Q. Was that board in the same situation as you saw it when the dam went out as it was when Mr. Fuller came up the next day to see the dam?

Objected to by counsel for plaintiff, unless the witness shows that he looked at the board in company with Mr. Fuller.

A. The board had not been moved visibly, as I could notice.

534.—13 Q. You can state whether or not that board as you observed it, and as it was when Mr. Fuller saw it with you the next day, was any material obstruction to the passage of water through that side of the overflow?

A. I noticed the board on both occasions. There was no visible change in its position either time. It would obstruct some probably—a little.

535.—14 Q. Was or was not the other side of the overflow entirely open?

A. It was.

536.—15 Q. State how wide this overflow is—the entire overflow?

A. Eight feet, less six inches.

537.—16 Q. How high is it from the bottom of the overflow to the top of the leaves when fully elevated?

A. Seventeen inches.

538.—17 Q. When the leaves during the spring were giving you trouble, one side forced up and the other remaining stationary, how high was the side forced up above the one remaining down? I speak of the side running crosswise.

A. It varied according to the pressure of water. The one side was up most of the time about two feet above the other side.

539.—18 Q. Was or was not the dam leaf under that went out on a constant and varying strain while you were working to get it to operate?

A. Yes; it was.

670 540.—19 Q. This is the leaf that went out five or six years ago—the same leaf?

A. I don't know; I was not here prior to five years ago.

541.—20 Q. State whether you measured the timbers running across the leaf, and, if so, what was their size?

A. There are three of them. One twelve by twelve (12 x 12), one ten by twelve (10 x 12,) and one eight by twelve (8 x 12). I measured them.

542.—21 Q. How long are the timbers?

A. A little over forty-two feet; I don't know the exact number of inches.

543.—22 Q. What kind of wood are they?

A. Hemlock.

544.—23 Q. The leaves of the bear trap on the other side stand firm, do they not?

A. They do.

545.—24 Q. State how wide the stream is, commencing at the fore bay at the right-hand side of the stream as you go down and across over to the farther side of the stream?

A. About a little over two hundred feet. I never measured it.

546.—25 Q. State about how this leaf—the one we are talking about, that went out—has been used with regard to the floating of logs?

A. That gate would not come up this spring, and the logs ran over just as they came—rolled and tumbled over; we had no control of them. Sometimes this spring the logs jammed on top of this leaf three or four logs high.

547.—26 Q. Which leaf has been most used?

A. This leaf has been used most heretofore.

548.—27 Q. State whether the other bear-trap chute is the same size as the one that went out, and how far it is from it?

A. It is not the same size. The distance between the two I don't know exactly; about ten or twelve feet. The gate that is up now is two or three feet wider. They raise about an equal height. They raise a little over seven feet.

Cross-examination by W. L. PIERCE, Esq.:

549.—1 X Q. Can you tell about how many feet or inches
671 it is from the top of the gates when up down through the gates to the top of the leaf chamber inside the gates?

A. Yes, sir; I don't know exactly; probably about seven inches. This is as near as I can tell you.

550.—2 X Q. The stage of water when the dam went out was substantially about the same stage of water as was at the dam yesterday?

A. I think it was just a little bit higher—three or four inches; something like that.

551.—3 X Q. This dam has side stops, has it not, on both upper and lower leaves?

A. Yes.

552.—4 X Q. The stage of water when the dam went out was no unusual or extraordinary height, was it?

A. No.

553.—5 X Q. You nailed those two boards across the overflow of the fore bay during the summer to save water.

A. Yes, sir.

554.—6 X Q. When did you kick this one board off?

A. From three to four days prior to the gate going out.

555.—7 X Q. The day you chopped the apron off these boards were both on, were they not?

A. They were a portion of that day. In the latter part of the day I kicked them off.

556.—8 X Q. That day was Thursday, the 21st day of March, last, was it not?

A. I think not. I think it was Friday; I am not positive.

557. 9 X Q. Why did you kick this board off and loose the other so that it hung from the side of the overflow?

A. I did it to get rid of what I call superfluous water.

558.—10 X Q. Why did you want to get rid of this extra water.

A. I also took a plank off the wasteway on the abutment. I did that from force of habit, so that drift-wood would run over the dam, and to keep the water level with the top of the gates, or nearly so. It is necessary to have the dam full of water at the time for driving purposes, and I did not want it any more than full. This is all the reason that I took it off.

559.—11 X Q. Could you calculate the pressure on the leaf that went out, assuming that it was forty-four feet long and seven
672 feet high when the water is running over the comb of the dam, when fully up; two feet deep, and is not relieved?

Objected to as improper cross-examination.

A. I cannot give it accurately.

560.—12 X Q. Did you not tell me yesterday afternoon when we were talking about the dam, that you took these boards off on Sunday before the dam went out?

A. I don't think I said so.

561.—13 X Q. Will you state positively that you did not tell me that you took these boards off on a Sunday?

A. I will state positively that I did not state so.

562.—14 X Q. How do you fix the date on which you kicked off the boards on the overflow?

A. I did not say positively as to the day. I think it was Friday; it was the day the drive went through here.

563.—15 X Q. What was the condition of the dam the day the drive went through here?

A. The dam was in bad condition that day. It would not come up of its own accord, so we built a temporary dam in front. It came up then.

564.—16 X Q. What work were you at on the dam the day the drive went through?

A. I was working at a good many things that day. I was putting in temporary dam, cutting off the apron, tearing down a jam of logs that had accumulated on the apron, and also put in some of

the sticks that had got loose below the apron; sawing alongside the leaf. That is about as far as I know.

565.—17 X Q. Did you chop the apron off all in one day?

A. I chopped a portion of it off the day before; I don't know how much. We could only work at it *pemporarily*, between the splashes in the dam.

566.—18 X Q. On which of the two days in which the apron was being cut off, did you kick off these boards on the overflow; was it on the first or second day?

A. It was on the second day.

567.—19 X Q. Removing these boards from the overflow would remove quite a good deal of strain from the dam, would it not?

673 A. It would remove some of the strain.

568.—20 X Q. It would take the strain off the gate, would it not?

A. It would, to a small extent.

569.—21 X Q. Did you ever figure up the extent to which reducing the pre*a*sure of water under the gates by eighteen inches would relieve the gates from strain?

A. It depends upon where the eighteen inches is, from my experience, it would not require more than half of that from the bottom of the fore bay. I give this from my experience from handling the wickets. I never figured it in pounds.

570.—22 X Q. Do you know the rule by which to compute the hydrostatic pressure on the under leaf of a bear-trap dam, when the water in the pool is at any given height above the top of the gates when up, and no overflow is possible?

A. I do not.

Redirect examination:

571.—28 Q. State whether or not the stops on the side of the chute below the upstream leaf are above the apron on the lower leaf?

A. They are above the apron when the leaf is up,

572.—29 Q. State, from your experience, in relation to the power of relieving pressure.

W. P. LAYBERGER.

Objected to as incompetent and irrelevant.

Objection sustained.

Mr. IRA COCHRAN duly sworn; called by defendants in surrebuttal. Subject to same objection as stated in testimony of Mr. Layberger.

Direct examination by Judge JENKS:

573.—1 Q. You were working on the Caledonia dam the day the leaf went out?

674 A. Yes.

574.—2 Q. You had charge of it a part of this spring?

A. Yes.

575.—3 Q. State what trouble you had with this leaf and how you managed it. State in detail. Is the statement just read to you from the testimony of Mr. Wm. Layberger, given in answer to interrogatory No. 8, substantially correct, as you recollect it?

A. Yes, sir, it is.

576.—4 Q. You can further state now your recollection of how the logs tumbled over the gates this spring, and whether or not the logs jammed thereon three or four deep at a time?

A. No, sir; they never did on the gates; they did on the chute.

577.—5 Q. Do you recollect the breadth of the stream from right-hand side looking down, including the two chutes, to the other side?

A. No, sir.

578.—6 Q. Were you there the day Mr. Layberger opened the overflow in the lower part of the fore bay?

A. I was there the day somebody opened it; I don't know who opened it. I saw it partly open.

579.—7 Q. Was the overflow open before the leaf went out?

A. Yes, sir.

580.—8 Q. You may tell, if you remember, who cut off the apron from the chute?

A. Myself, Mr. Layberger and one of the corporation men.

581.—9 Q. The apron has not been cut off the outer chute has it?

A. Not that I know of.

582.—10 Q. What is the comparative size of the two chutes, and how far apart are they?

A. I don't know positively; I never measured. I have heard it said that the gates were forty-four feet each. That is all I judge from.

583.—11 Q. How many inlet and how many outlet wickets are used in this dam that went out?

A. There are two to let the water in and one to let it out.

584.—12 Q. Do you know the size of the wickets?

A. No, sir.

675 585.—13 Q. Do you know how long these chutes have been in the stream?

A. I think about six years; I think they were put in at the same time.

586.—14 Q. The far one is still standing intact, is it not?

A. It was this morning at 8 o'clock.

Cross-examination by W. L. PIERCE, Esq., under former objection:

587.—1 X Q. When you saw the overflow after some one had partially removed the boards, what was the position of the board that was still nailed on the fore bay?

A. One was left on and the other was off.

588.—2 X Q. Was the one that was left on in the same position that it has been, or had it been moved to any extent?

A. My opinion is that the board was loose.

589.—3 X Q. You mean that the nails had been loosed, but that the board remained substantially in the same position that it had been in before the other board had been kicked off. Is that correct?

A. I don't recollect of noticing any change in the board whatever.

IRA COCHRAN.

J. F. STEIN, duly sworn; called on the part of defendant in surrebuttal.

Direct examination by Judge JENKS—subject to same objections as foregoing testimony at this hearing:

590.—1 Q. State whether you were present at the Caledonia dam when the leaf went out?

A. Yes, sir.

591.—2 Q. State whether you noticed what is called the overflow, and whether it was on or off; and tell all you remember about it just before the dam went out.

A. I noticed what they call the overflow; the boards were taken off—one clean off and one end of the other board off;
676 & 677 one end hung by a nail or two to the timber. The board swung upstream. The loose end was up on the float.

592.—3 Q. You may state whether or not the whole overflow was substantially open, so that the water could come up from the valve and flow over.

Objected to as a contradiction of the former witness, Ira Cochran, who has just left the stand.

A. For my part, I could not see what would hinder the water from going through the other; the board was knocked clean off; and I could not see why it would hold back much water from going through the others, the position it laid in.

No cross-examination.

J. F. STEIN.

Adjourned to meet at Du Bois, Wednesday, April 10, at 3 o'clock p. m.

And now, Wednesday, April 10, 1889, met at Du Bois, pursuant to adjournment.

Present: Same counsel as before.

C. F. FULLER, called on behalf of defendant in surrebutal.

The testimony of this witness objected to by counsel for plaintiff on the ground that defendant is not entitled to surrebuttal.

Direct examination by Judge JENKS:

593.—1 Q. Have you any knowledge of what is called the Caledonia bear-trap dam?

A. I have.

594.—2 Q. State who superintended the construction of it.

A. Mr. Wm. Gray. I was there off and on and was there at the finishing up.

595.—3 Q. Do you know how high it rises?

A. Seven feet. It might be a few inches over.

678 496.—4 Q. Do you know the number of bear-trap chutes there are in the dam?

A. There are two bear-trap chutes.

597.—5 Q. Do you know their width?

A. They are something near 44 feet, more or less.

598.—6 Q. You may state when it was built, the dam.

A. In the summer of 1882.

599.—7 Q. Do you know how wide the stream is at that place?

A. No, sir; I never measured it.

600.—8 Q. Are there stops, or have there been side stops used on both chutes of this dam?

A. Yes, sir.

601.—9 Q. You may state whether there was or was not any cross-stop fastened to the under side of the upper leaf, against which the lower leaf would stop and be held within the lap of the upper leaf.

A. Not any.

602.—10 Q. You may state what was attached to the upper end of the upper leaf which lapped over the lower leaf, if anything was used.

A. There was what we called an apron.

603.—11 Q. How far did it extend down over the top of the lower leaf?

A. It was about three feet longer than the lower leaf. This was when we first built the dam.

604.—12 Q. What was its subsequent length, and what is its length now?

A. I should say from six to eight feet over the dam that is still there. On the other chute the apron was cut off again; it ran irregularly, from two to four feet.

605.—13 Q. When the dam was built, were there any stops on the lower leaf, at the side of the chute?

A. There were none.

606.—14 Q. How long are the side stops now over the apron?

A. I should say from six to eight feet, from looking at them. I never measured them. They are on the lower leaf above the apron. The stops run up to the apex of the dam.

607.—15 Q. Do you know anything about an overflow that was used in connection with the bear trap next the right-hand side of the stream—dam next the mill?

A. Yes; there is an overflow there.

679 608.—16 Q. Did you visit the dam any time during last winter?

A. I did.

609.—17 Q. When was it?

A. It was on the 11th day of February, according to my diary.

610.—18 Q. State what condition you found the lower leaf of dam next to the mill in?

A. The end of the dam next the mill was cocked up four feet; the further end of the dam was down level.

611.—19 Q. State what was the state of the weather and the condition of the ice at that time?

A. The weather was down to about zero. The dam was what I call frozen in its position.

612.—20 Q. State what effect that had upon springing the leaf?

A. It would have a tendency to break those timbers underneath the leaf.

613.—21 Q. State when you next visited that dam in March last?

A. It was a day or two after the leaves went out.

614.—22 Q. State in what condition you found the overflow at that time, whether opened or closed?

A. I found the overflow open. Mr. Leeds, the foreman, wrote to me to come to the dam to see what I could do with it.

615.—23 Q. You may state whether you heard Mr Layberger's testimony in regard to how the overflow was open?

A. I did.

616.—24 Q. State what you found at that time?

A. I found a board—one board was off the overflow entirely; the other board hung by a nail in one corner, the other end dropped down on the float. I picked it up. The fastening was not enough to hinder me from picking it right up. I measured the width of the board.

617.—25 Q. Please state how the water comes in, in order to get through that overflow?

A. It raises up from the bottom.

618.—26 Q. State, as you found that board, whether there
680 would be or would not be any considerable impediment to the discharge of the water to the full capacity of the overflow?

A. There would not be if the board remained in the same position as I found it.

619.—27 Q. State whether or not the water which was discharged in the overflow, as it was pressed from below, would pass between the board and the overflow?

A. It would, with the board in that position.

620.—28 Q. Do you know how much lower than the apex of the dam, when the leaves were raised to their full height, the bottom of the overflow was?

A. Seventeen inches, according to my measurement.

621.—29 Q. You may state whether you did this morning make an observation of the hinge sill on which the lower end of the leaf was fastened, and, if so, what was its condition?

A. I found the hinge sill had sagged down-stream—the center of it—from four to five inches out of line; it might have been more.

622.—30 Q. State whether or not you noticed the condition of the

hinge eyes on the under side, in reference to the lower edge of the lower leaf, as to whether any and how many of them had been broken, and how recently they appeared to be broken; and also what, if anything, you noticed with regard to the hinge rod.

A. I noticed the hinges. I thought some were new and some were old breaks. It is not uncommon to find on our dam these old style of hinges broken.

623.—31 Q. What was the proportion of the old breaks of the hinge eyes on the half of the lower leaf nearest to the saw-mill?

A. I did not count them.

624.—32 Q. State whether or not the half of the hinge rod nearest to the saw-mill was left up at the hinge sill?

A. There was one section of the rod on the hinge sill, fastened partly to it; and the other section was on the gate.

No cross-examination.

C. F. FULLER.

681 *Statement Showing Size of Dams on Defendant's Property.*

KIRK *vs.* DU BOIS. } In Equity. Exhibit No. —.

Statement offered by John Du Bois showing width of dams and length of leaves respectively.

The Kilmer dam is 22 feet wide.
" Keen " " 22 " "
" Jo Hand " " 24 " "
" Twin " " 18 " "
" dam next the bank by mill is 20 feet wide.
" " near mill " 12 " "
The Kilmer dam raises 5 feet 6 in.
" Keen " " 5 " 6 "
" Jo Hand " " 5 "
" Twin " " 4 "
" dam next to bank by mill raises 4 feet 6 in.
" " near mill " 4 " 6 "
Length of lower leaf Kilmer dam is 15 "
" " upper " " " 14 "
" " lower " Keen " " 15 "
" " upper " " " 14 "
" " lower " Jo Hand " " 15 "
" " upper " " " 14 "
" " lower " Twin " " 10 " 6 in.
" " upper " " " 9 " 2 "
" " lower " dam next to bank by mill, 15 feet.
" " upper " " " " " " 14 "
" " lower " " near mill is 17 "
" " upper " " " " " 15 "

This statement is to the best of his information, the measurements having been made by Mr. Nettleton under his instructions or under instruction by his counsel.

Filed July 7, 1890.

H. D. GAMBLE, *Clerk.*

682 *Statement Showing Cost of Construction of Bear-trap Dam.*

KIRK *vs.* DU BOIS. } Exhibit No. —, Dec. 30, 1888.

And now, Dec. 20th, 1888, statement offered by Judge Jenks, in pursuance of notice from complain-t, showing cost of construction of bear-trap dam on Du Bois property; which statement is now put upon the record:

There is required 12,788 feet of pine, at an estimated cost of $12 per thousand; 6,530 feet of hemlock, at $6 per thousand; 92 feet of oak, at —; the cost of the iron-work is $160.71; the cost of labor is $124.45. This is the estimate cost for building the largest bear-trap dam on the Du Bois property, but does not include the cost of digging out the foundations for the dam structure.

Filed July 7, 1890.

H. D. GAMBLE, *Clerk.*

683 *Summary and Detailed Statement of Watchmen's Time at Du Bois Dams.*

PITTSBURGH, *May 15th*, 1889.

John E. Du Bois, Dr., to Arthur Kirk for use of Kirk's invention described in claim sixth of patent No. 268,411, dated Dec. 5th, 1882, as per decision of U. S. circuit court, Dec. 31st, 1887.

Based on the fact that John E. Du Bois should pay Kirk whatever it would have cost Du Bois to protect his dams as well by any other plan, and as has been shown by the testimony that the only plan to do this was to have had watchman day and night on duty at each dam, except the two dams below the mill, which are so close together that one man could attend to both, and as this would require a man of steady habits and same qualifications as a foreman of creek crew, and as Mr. Vosburg on page 7 of meeting of Jan. 28, 1889, says wages of foreman of creek crew *was* $2.00 per day for the year 1884 and have been $2.25 per day ever since, I therefore count the wages of dam-tender at same price, and count one man on duty 12 hours day turn and 12 hours night turn, making $4.00 per 24 hours for the year 1884 and $4.50 each day since, as follows:

Days in 1884..	1,116 da., at $4.00	4,464 00
" " 1885..	1,060	
" " 1886..	920	
" " 1887..	1,816	
" " 1888..	1,512	
" " 1889..	280	
	5,588 da., at $4.50	25,146 00
		29,610 00

684 *Details of Time the Du Bois Dams were Used from* 1884 *to May* 15, 1889.

Feb. 18, 1884–Nov. 24, 1884.

During 1884.

	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sep.	Oct.	Nov.	Dec.	Totals	
2 dams at saw-mills	.....	10	31	30	31	30	31	31	30	31	24	.....	279	
1 Chamber Commerce	.....	10	31	30	31	30	31	31	30	31	24	.....	279	
1 Narro-s Creek	.....	10	31	30	31	30	31	31	30	31	24	.....	279	
1 Shaffer	.....	10	31	30	31	30	31	31	30	31	24	.....	279	
														1,116

During 1885: M'ch 26–Oct. 24.

1 Chamber Com. D.	....	.....	5	30	31	30	31	31	30	24	.....	.....	212	
2 dams at saw-mill	.....	.....	5	30	31	30	31	31	30	24	.....	.....	212	
1 Shaffer D.	....	.....	5	30	31	30	31	31	30	24	.....	.....	212	
1 Narro-s Creek D.	....	.....	5	30	31	30	31	31	30	24	.....	.....	212	
1 Killmar dam	.....	.....	5	30	31	30	31	31	30	24	.....	.....	212	
														1,060

During 1886: { May 17–Sept. 1. / Sept. 1–Oct. 30.

1 Chamber C. D.	.....	.....	.....	13	31	30	31	31	.....	.....	.....	.....	136	
2 dams below mills	.....	.....	.....	13	31	30	31	31	30	30	.....	.....	196	
1 Shaffer dam	.....	.....	.....	13	31	30	31	31	30	30	.....	.....	196	
1 Narro-s C. dam	.....	.....	.....	13	31	30	31	31	30	30	.....	.....	196	
1 Kilmar "	.....	.....	.....	13	31	30	31	31	30	30	.....	.....	196	
														920

During 1887: { Feb'y 11, 1887–July 15. / July 15–Nov. 15.

2 dams below mills	.....	17	31	30	31	30	31	31	30	31	15	.....	277	
1 Shaffer dam	.....	17	31	30	31	30	15	.....	.....	.....	.....	.....	154	
1 Kilmar "	.....	17	31	30	31	30	31	31	30	31	15	.....	277	
1 Narro-s Creek dam	.....	17	31	30	31	30	31	31	30	31	15	.....	277	
1 Tom Keen "	.....	17	31	30	31	30	31	31	30	31	15	.....	277	
1 Jo Hand "	.....	17	31	30	31	30	31	31	30	31	15	.....	277	
1 Fair Ground "	.....	17	31	30	31	30	31	31	30	31	15	.....	277	
														1,816

During 1888: M'ch 14–Nov. 21.

1 Shaffer dam	.....	.....	17	30	31	30	31	31	30	31	21	.....	252	
1 Kilmar "	.....	.....	17	30	31	30	31	31	30	31	21	.....	252	
1 Narro-s "	.....	.....	17	30	31	30	31	31	30	31	21	.....	252	
1 Tom Keen dam	.....	.....	17	30	31	30	31	31	30	31	21	.....	252	
1 Jo Hand	.....	.....	17	30	31	30	31	31	30	31	21	.....	252	
1 Fair Ground	.....	.....	17	30	31	30	31	31	30	31	21	.....	252	
														1,512

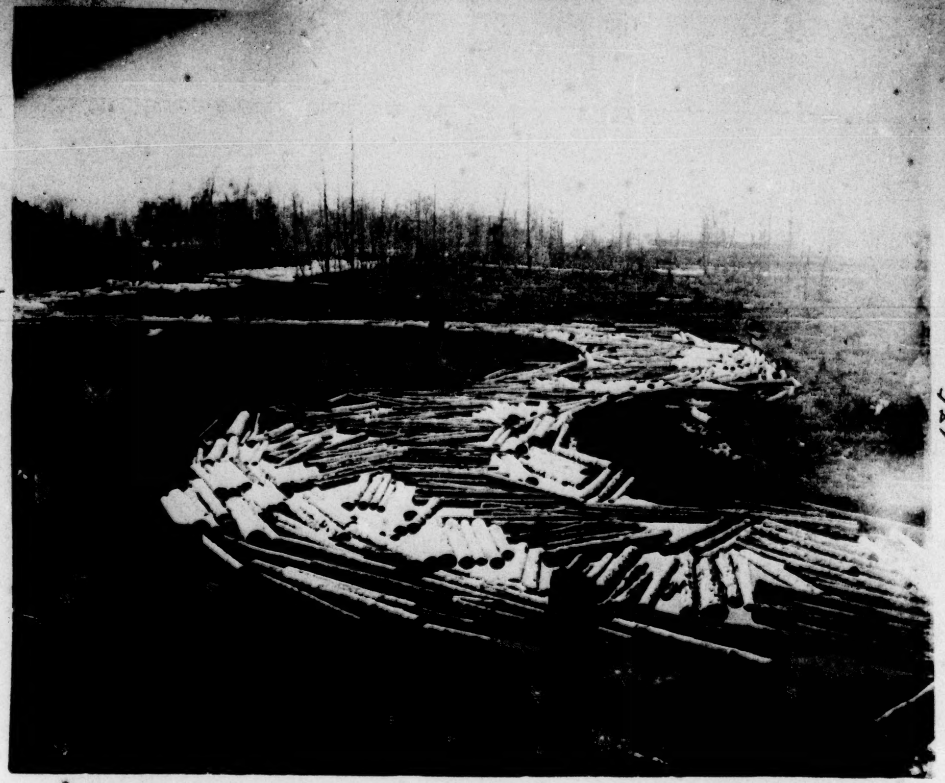
During 1889: M'ch 20–May 15.

2 dams at mill	.....	.....	11	30	15	.....	.....	.....	.....	.....	.....	.....	56	
1 Kilmar dam	.....	.....	11	30	15	.....	.....	.....	.....	.....	.....	.....	56	
1 Jo Hand "	.....	.....	11	30	15	.....	.....	.....	.....	.....	.....	.....	56	
1 Fair G'd "	.....	.....	11	30	15	.....	.....	.....	.....	.....	.....	.....	56	
1 Tom Keen dam	.....	.....	11	30	15	.....	.....	.....	.....	.....	.....	.....	56	
														280
														6,704 days.

(Here follow drawing & photographs marked pp. 684½, 685, 686, & 687.)

No 240
DeBors
v.
Kirk
&
No 259
Kirk
v
DeBors

p. 685



689

No 240
DeBois
&
Kirk
&
No 259
Kirk
&
DeBois

p 686

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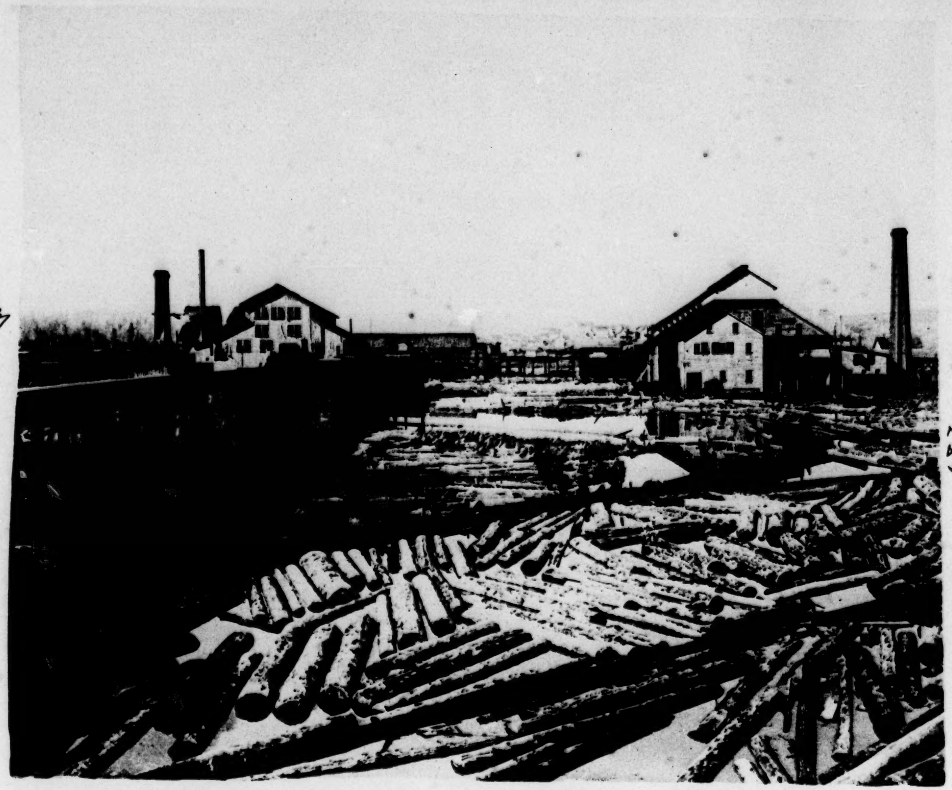
No. 240.
DeBois
v
Kirk
&
No 259
Kirk
v
DeBois

h 687



687

In the Circuit Court of United States.

ARTHUR KIRK
versus
JOHN E. DU BOIS. } No. 39. November Term, 1886. In Equity.

On accounting.

To the honorable the judges of said court:

The master to whom this case was referred to take, state and report to the court an account of the gains and profits which have accrued to the defendant, as well as the damages sustained by the complainant by reason of the infringement of the letters patent recited in the bill in this case, would respectfully report as follows:

The testimony taken, together with the exhibits, *are* herewith returned.

The master has attempted to state briefly the facts which he deems undisputed, and which are necessary for a proper understanding of the case.

Before entering into the case, however, the master will state that the dams on defendant's property were visited a number of times by the master, counsel for complainant and defendant, and by the complainant himself; and a full opportunity for inspecting the workings and operations of the dams was given to the master and all parties concerned.

689 The plaintiff's patent, No. 268,411, dated Dec. 2, 1882, is for a new and useful improvement in movable dams. His invention relates to "improvements in the construction of movable dams by which they are stronger, safer, more durable and more easily operated than those heretofore in use." The plaintiff asserts that by his improvements defects heretofore existing in the old bear-trap dam are overcome. His patent covers a number of improvements, but only one of which is of any importance in this matter, as it is the only one which the court held was infringed by the defendant, namely the sixth claim, which reads as follows: "A bear-trap dam having a relieving or open sluice extending from under the gates so as to relieve them from unnecessary pressure, substantially as and for the purposes described." His invention, so far as the dams in question are concerned, is for an improvement of, or for a device in connection with, a bear-trap dam, and not for a complete dam.

From a review of the evidence and proceedings in this case prior to the reference to the master, from the decree of the court, and from the evidence before the master, the particular infringement by defendant consisted in the lowering or cutting off of the lower end wall of the fore bay of the dam at such a point below the apex of the dam when up, sufficient to maintain the leaves of the dam at a particular height and thus relieve the pressure from under the leaves. The lowering of the fore-bay walls of the dam constitute

the complainant's relieving device, and was the only device that the master is able to understand was embraced in complainant's sixth claim, and was infringed by defendant in this case. The importance of this question will appear on the question of accounting.

The defendant is the owner of a number of dams in Clearfield county, Pa., situate on the Sandy Lick creek and its branches. The title to these dams together with other property, was derived from his uncle, John Du Bois, on January 17, 1884. The whole
690 number of dams on the property conveyed to him at that time was fifteen; thirteen of these were provided with what are called bear-trap schutes, or known as bear-trap dams, but only five of these dams were provided with overflows to the fore bays, being the particular infringement complained of in this case. These five bear-trap dams thus provided with overflows or relieving devices were the two dams at the defendant's mill (together constituting one), the Jo hand or Chamber of Commerce dam, the Narrows Creek, and the Shaffer dam, situated along the Sandy Lick creek and its branches, and at considerable distances above the mill. Since January 17, 1884, the defendant built four additional bear-trap dams, the Tom Keen, the Jo Hand, the Fair Ground, and the Kilmer dam. The Kilmer dam was built in 1884, and used in the spring of 1885. The other three were built in the fall of 1886, and used in the spring of 1887. The old Jo Hand was torn out in 1886, and the Shaffer dam in 1887. There were other bear-trap dams in use by the defendant, but these are the only ones which were provided with the overflow device. These dams are situated along the streams above the defendant's mill, at considerable distances from each other. The distance from the mill to the farthest dam, (the Tunnel dam,) following the windings of the stream, is about fifteen miles. The stream upon which these dams are built is an unnavigable one and very small. The stream is very sluggish and crooked, the surrounding country being low and swampy. The banks are of clay and are very low, and at a number of the dams it is necessary to build artificial earth embankments to confine the water in the bed of the stream to maintain a proper height of water. The banks of the stream are from three to five feet in height, and a height of six feet of water in the stream would flood the surrounding country for a considerable distance and completely flood the dam structure. The dams built and operated by defendant are quite small, varying from eighteen to twenty-four feet in width, the largest not exceeding twenty-four feet. The elevation
691 of the leaves when at their full height being twenty-three degrees, and the height of the dam when thus elevated is from 4½ to 5½ feet. The cost of construction of such dams, exclusive of the cost of the excavation in the bed of the stream, is about $500. A statement giving the size and elevation of each dam and an approximate cost of the construction of a dam, is filed with the testimony. The cost of constructing a bear-trap dam not provided with complainant's relieving device is the same as the construction of one with overflows, and the cost of applying complainant's relieving device to a bear-trap dam, to use complainant's own

words, is "practically nothing. It only requires the lower end of the fore bay to be left that much lower than the comb of the dam when up." The dams in use by the defendant were built and are used for the sole purpose of raising artificial floods to drive logs, with the exception of the two dams above mentioned, which are located at the defendant's mill, and which are used in addition to this to create and maintain a pool at the mill for holding and sorting the logs which are floated along the stream to the mill. The dams when not in actual use are let down. When there is sufficient water, natural water, in the stream to float the logs along the courses of the stream to the mill where they are manufactured into lumber the dams are not used and remain down. Five feet of water in the stream is sufficient to float the logs. The season for log-driving varies. The dry season when the water in the stream becomes low and the dams are required to be used in order to create sufficient head of water to float the logs, usually begins at the last of May and continues until last of November. During this time the dam may be said to be in constant use. After the logging season is over, the dams remain down, and when down no attention is required. In the very dry season of the year in logging operations with these dams it becomes necessary, when the water in the stream becomes very low, also to close up the fore-bay end
692 wall and all apertures in the dam in order to save and accumulate enough water in the stream to float or drive the logs from one dam to another. When the dams are closed in the fall and remain down there is no necessity for any relieving device, or any attention to them whatever for their protection.

It might be proper here to describe briefly the construction and the method of operation of a bear-trap dam. What are known as bear-trap dams have been in use for a great many years. The dam consists of two movable leaves, the upper leaf overlapping slightly the lower one, hinged to timbers in the bed of the stream. These leaves are constructed of heavy timbers bolted together, and when they are down flat in the stream they constitute what is known as the schute of the dam. At the side of the leaves are constructed abutments or fore bays extending the whole length of the dam, by means of which water is introduced under the leaves. In the fore bay at each end are openings which are controlled by valves or wickets. From an opening in the fore-bay wall the water enters under the leaves of the dam. To raise the leaves of a bear-trap dam the wicket in the upper end of the fore bay is opened, permitting the water from the stream to enter the fore bay and thence under the dam. To lower the dam the upper wicket is closed, and the lower one opened, and the water runs out of the dam. These wickets are also termed the inlet and outlet wickets. The injuries to a bear-trap dam, except the ordinary wear from age, use and the injuries from floating logs, consist in the lower leaf being torn by the force of the water from under the upper leaf, thus wrecking the dam. This does not ordinarily injure the foundation of the dam, but merely the leaves. The object of complainant's device is to prevent the lower leaf from being swept out by relieving and limiting the pressure

under the leaves, and maintaining them at a certain fixed height above which the water will exert no pressure upon them. This was the only injury to these dams that your master was able to
693 learn, and the only injury which complainant's device is intended to prevent. The cost of replacing the lower leaf is very trifling. The ordinary life of these bear-trap dams is from seven to eight years.

The plaintiff's device or improvement as applied to these dams is for the purpose of limiting the height of the water in the fore bay and under the leaves of the dam below the level of the water in the upper pool. When the water reaches a certain height under the leaves of the dam it is discharged through a free opening, and thus relieves the pressures and protects the leaves of the dam. The device stands ready at any time to carry off any surplus water, and is automatic and self-regulating in its operation. The water entering the dam never rising higher than the discharging point. The defendant made use of the relieving device or method by lowering the end wall of the fore bay to the height required. The fore bay as constructed on defendant's dams nor the wicket used to operate the dams, are no part of complainant's invention. Plaintiff's device is then only for an improvement of a particular part.

The master has not attempted to limit or restrict the claim of complainant's patent, but it is impossible for him to enter into the subject of accounting without an understanding of some definite manner of infringement by defendant.

The findings and conclusions of the master, as far as this accounting is concerned, apply only to the small dams on defendant's property, used for logging operations, and would have no bearing to relieving devices or methods when applied to large dams on the large navigable streams and used for navigable purposes.

No evidence was offered, or claim made, by the complainant before the master for damages sustained by reason of said infringement, so that the question properly before the master is the extent of the profits and gains made by defendant.

694 In this accounting the master has only considered the case from the time defendant derived title to the property or dams on January 17, 1884, down to the time of the date of the injunction, to wit, December 31, 1887, for the following reasons: In complainant's case in rebuttal evidence was introduced to show that the defendant was still continuing acts of infringement of complainant's invention (that is the sixth claim) not by the use of the overflow devices, but in a new manner; that defendant was permitting leakage around the wickets or valves in the fore bay, and around the side of the leaves of the dam, and was controlling the leaves of the dam by the use of the wickets in the fore bay of the dam by what is called "cocking the wickets;" these acts, it being alleged, constituted an infringement of complainant's relieving device.

A mass of evidence was taken on both sides on this branch of the case, and the matter exhaustively argued before the master on the final argument, but subsequently the complainant filed with the master (which is herewith returned) a disclaimer for all profits or

damages since December 31, 1887. The overflows on all defendant's dams in pursuance to the decree of the court were closed on December 31, 1887, and have remained closed ever since that time.

We now come to the question what profit has the defendant made from the use of the plaintiff's device.

The evidence offered by complainant on the question of profits may be stated in substance as follows: Mr. Arthur Kirk, the complainant, testified that he is familiar with the art relating to bear-trap dams at the time of his invention, that his knowledge was derived from reading works on the subject, from the inspection of models and other dams. He admits that he never built or operated a bear-trap dam. He states that there was no device or method prior to his invention that was successful in preventing accidents to bear-trap dams. That there were no devices or methods
695 prior to his invention successfully used for the purpose of limiting the height of water in the fore bays of bear-trap dams, below the level of the water in the upper pool. That his device was the first that was capable of practically and successfully accomplishing this result. That the cost of applying his device as described in his patent was practically nothing as it only required the lower end wall of the fore bay to be left that much lower than the comb of the dam when up. That the damages to a bear-trap dam consisted in the lower leaf being swept from beneath the upper leaf of the dam. That to effect the same result as his device it would require constant manual attention at the dams by human labor to regulate and watch the height of the water in the dam, and adjust the gates to the varying pressure; that it would be necessary to employ a man day and night at each dam, but in no event would such manual labor be as successful as his device. That by his device no labor or manual attention whatever was required at any time. That by use of his invention the defendant has gained to the extent of what it would have cost him to have employed manual labor to watch and protect the dams, and he has submitted a statement in the form of an account showing the number of dams in use, the number of men, and the length of time in which they would necessarily have to have been employed in each year when the dams were in actual use, allowing for the time that the dams are not used after the closing of the logging season in each year. He thus computes the profits which he claims the defendant derived from the use of his invention to the amount of $29,610. In other words, the testimony of the complainant is that the defendant has saved this amount by the use of his automatic relieving device, without which he would have been compelled to employ constant manual labor. This is complainant's theory of defendant's profits.

Col. Thomas P. Roberts' testimony is practically the same
696 as Mr. Kirk's; that there was no device or method at the time of complainant's invention, or in use now, that would accomplish the same result as this relieving device. The only other method is by constant manual attention at the dam, day and night. Mr. R. A. Roberts, another witness on behalf of complainant, states

the same facts. This is the only testimony offered by complainant directly on the question of profits.

There is nothing in this testimony, in the mind of the master, that goes to the question of actual profits. The master understands the law to be that the burden is upon the complainant, and if he fail to give necessary evidence, he must fail for want of proof. The actual damage sustained or profits gained must be established by trustworthy legal proof.

The evidence set up by the defendant is two-fold:

First. A broad denial of any profit, advantage or gain derived from the use of complainant's invention.

Second. Devices or methods in use at the time of complainant's invention, and open to the public and adequate to enable him to obtain an equal beneficial result.

As to the first defence, John E. Du Bois, the defendant, testifies that he never employed any one, nor has any one ever been employed specially to take charge of his bear-trap dams or other dams, for their protection, either before or since the injunction in this case. That no person was ever employed to take charge and watch his bear-trap dams that had no overflow or relieving device. That no one has ever been employed to take charge of his dams since the overflows have been nailed up. That it never cost him any more to take charge of the bear-trap dams without overflows than it did those with overflows. That he has derived no actual profits from the use of the invention. That no injuries have ever happened to his dams.

Defendant then testifies as to the method of using his dams in his logging operations. A number of men are employed
697 during the log-driving season along the creek in driving the logs as they come from the woods, through different dams, to the mill, where they sort them and put them in their proper places. Their duties also require the opening and closing of the dams and all operations connected with them, in raising floods or splashes to drive the logs. These men are called the creek crew. The time spent in the management and operation of the dams is a very small part of their duties, and requires but little time. The control and operation of the dams is part of their duties for which they are employed. Mr. John Horner, an employé of defendant and superintendent of his dams, testifies that the number of creek men employed has remained the same for a number of years, and has not been increased since the overflows were nailed up, and the number of the crew was six. That no person has been employed since the overflow device of complainant, was nailed up on each dam.

Other witnesses testified as to the nature of the employment of the creek men, and the same may be considered established by witnesses for defendant.

Mr. George R. Vosburg and C. F. Fuller, and others, testified as to the fact that no person was ever employed to watch the dams with or without overflow device before or since the injunction.

Testimony was also given by defendant as to the use of the dams. In winter when the streams are frozen the dams are not used and

no attention is required. When there is sufficient natural water in the stream to float the logs the dams are not used. In very dry seasons it becomes necessary to close up the fore-bay walls and every aperture in the dam in order to save water and obtain a sufficient supply of water to run the logs in the stream. So that for a considerable portion of the year his dams are not in use and require no attention. Defendant has thus attempted to deny the charge or presumption of actual profits or gains derived from use of complainant's invention.

698 It is established by the defendant, beyond question, that on other bear-trap dams where no relieving device was ever used defendant never was at any expense or employed any person to watch them for their protection. It is also fully established that since the defendant stopped using complainant's device, that is since the injunction, he has been at no expense, nor has he employed any one to watch and protect his dams. In the mind of the master there is strong evidence to disprove the allegation that the use of complainant's device resulted in profit to defendant, or the presumption that profit resulted from the use of the invention.

The other defence is:—Other devices or methods in use and open to the public at the time of complainant's invention and adequate to enable the defendant to obtain an equally beneficial result.

The devices set up are:—Side stops or cleats nailed or bolted to the side of the dam above the upper leaf, chains, transverse bars on the under edge of the upper leaf, by the use of the wickets in the fore bay called "cocking the wickets," and by floats to regulate and operate the wickets.

Counsel for complainant contends that the defendant in the selection of devices which he asserts he could have used in the place of complainant's is restricted:

1. To devices known at least as early as the date of complainant's invention.

2. To devices adequate to enable him to obtain an equally beneficial result.

3. To devices which had for their purpose relief not resistance.

Admitting the first and second qualifications for the purpose of this case, your master differs with counsel for complainant as to the last qualification or test. Counsel for complainant contends that the side stops and other mechanical devices of like nature cannot be set up as equivalent devices because they "resist but do not relieve pressure as is accomplished by complainant's device."

699 Complainant's patent is intended to relieve the pressure under the leaves of a bear-trap dam. Side stops and other devices of a like nature are intended to resist the pressure. The result in each case is protection to the leaves of the dam by preventing them from being swept out. The whole object and purport of complainant's invention, in his own words, is to prevent injuries to bear-trap dams. The object of his device is not relief, but protection; and whether this result is accomplished, and whether this end is obtained by devices which resist, or those which relieve pressure under the leaves of the dams, they are, in the master's opinion, the same

and are equivalent devices. Taking this view of the case the master permitted the defendant to set up these devices as a standard of comparisons.

Side stops or cleats are large timbers nailed or bolted against the walls of the dam or gate chamber, against which the upper leaf, when it rises, presses and is prevented from being swept out. These side stops were in use on defendant's dams at the same time as the overflow device was used. They were in use before, and have been in use since the injunction in this case. It is admitted by complainant and proven by other witnesses on behalf of defendant that these side stops were used prior to complainant's invention, but the efficiency of this device in protecting the dams is denied by complainant.

A great deal of evidence was taken on this question, but the master is of the opinion, and so finds that side stops as used on the small dams of the defendant are sufficient to withstand all pressure brought upon the leaves of the dam, and afford as adequate protection to the dams as the complainant's automatic relieving device. The master is aided in this conclusion from observation and inspection of the dams themselves.

Another device set up by defendant is that of a transverse bar fastened under the lower edge of the upper leaf against which
700 the lower leaf strikes when it rises and prevents the leaf from rising further. This was established by competent evidence to be an old device in use at time of complainant's invention, and was used by defendant at the same time as he used the overflow and is in use now. While it may not afford the same practical result as complainant's device, yet, when used with the side stops, it greatly lessens the chances of injuries to the dam.

Plaintiff attempted to establish the fact that the side stops and other devices were of no protection to the dam whatever, but this is disproved by the overpowering weight of the evidence offered by defendant. Nor did plaintiff attempt to apportion the advantage gained by his device in connection with the use of side stops or other devices used by defendant at the same time that he used the complainant's relieving device.

These devices were used by defendant in connection with complainant's relieving device. How much is attributed to complainant's device and how much to the others the master is unable to say, as defendant's testimony is that no injuries ever happened to his dams. But that the master may not be misunderstood, he again asserts that had they been used alone they would have afforded all the protection that complainant's device could have done.

The next device which defendant sets up is that of controlling the leaves of the dam by means of the wickets in the fore bay, called "cocking the wickets."

This operation may be described as adjusting the wickets in the fore bay so that the water discharged by the lower or outlet wicket shall equal that admitted by the upper or inlet wicket, so that the dam will remain stationary. It consists in so regulating the wickets that the pressure under the leaves will remain uniform. The

wickets or valves of the dam are no part of complainant's invention; nor are the fore bays.

The complainant admits (X Int. 97) that the pressure and height of water beneath the leaves of bear-trap dams can be controlled by the use of inlet and outlet wickets.

701 Col. Thomas P. Roberts, complainant's witness, testifies to the same (X Int. 200); and the defendant has proven the same fact.

The testimony of defendant and his witnesses is that this can be practically and successfully done, and has been used by the defendant. The master is of the opinion that evidence sufficient to establish this fact was given by the testimony of C. F. Fuller, John Horner, Rulof Rulofson and others.

As to the use of floats as a means of regulating the wickets and controlling the pressure of the water under the leaves the evidence as to their practical use and operation was so indefinite that your master will dismiss the subject without further comment.

In either of these defences the master is of the opinion that the position taken by plaintiff would not justify a decree for profits. The gain or advantage derived by defendant must be actual. If he has realized no profits, he cannot be called upon to respond for profits.

Elizabeth *vs.* Pavement Co., 97 U. S., 126.

The mere use does not mulct the infringer for damages and profits.

Black *vs.* Thorne, 111 U. S., 122.

The master fails to see where the use by defendant of complainant's device has resulted in any actual or positive gain to defendant. This is expressly denied by defendant, and established by reliable and convincing evidence. The plaintiff has failed to show any actual profits derived from the use of his invention by defendant. In the absence of such proof the damages must be merely nominal.

The master therefore finds the following facts to be proven by the evidence:

First. That the defendant is the owner of a number of dams situate on the Sandy Lick creek and its branches in the county of Clearfield, Pa.; that on January 17, 1884, the time he derived

702 title to the property, he had in use five bear-trap dams which were provided with overflows to the fore bay or with complainant's relieving device. Subsequently four additional bear-trap dams were built and used which were also provided with the complainant's overflow device. Two of these dams were torn out, one in 1886 and the other in 1887. Defendant also had in use other bear-trap dams not provided with any relieving device.

Second. That the Sandy Lick creek, upon which these dams are built, is an unnavigable stream and very small. The stream is very sluggish and crooked. The banks are of clay and very low, being from three to five feet in height.

Third. That the bear-trap dams owned by defendant are built

and used solely for the purpose of raising artificial floods in the stream for driving logs; that is, for log-driving purposes only, except the two dams at defendant's mill which are used also for the purpose of maintaining and creating a pool for handling the logs brought to the mill.

Fourth. That the bear-trap dams (used by defendant) are quite small, varying from eighteen to twenty-four feet in width; the elevation of the leaves being twenty-three degrees; the height of the dams when up, from 4½ to 5½ feet. They are constructed of heavy timbers and placed low in the bed of the stream.

Fifth. That the infringements by defendant consisted in the lowering or cutting off of the lower end of the wall of the fore bay to these dams.

Sixth. That the cost of applying the complainant's relieving device to the defendant's dams was practically nothing.

Seventh. That the only injury to which bear-trap dams are subject except from the ordinary use of the dam and injuries to them from floating logs and timbers, is the lower leaf of the dam being swept from beneath the upper one by the pressure of the
703 water under them, and that this is the only injury from which complainant's device is intended to protect the dams.

Eighth. That complainant's device when used on bear-trap dams is capable of practically and successfully accomplishing this result.

Ninth. That side stops or cleats nailed on the side of the dam or leaf chamber, transverse bars on the lower edge of the upper leaf, the use of the wickets in the fore bay in controlling the leaf of the dam, are devices or methods capable of protecting the leaves of bear-trap dams, and will accomplish this result on bear-trap dams as used and constructed by defendant as adequately as complainant's relieving device, and that these devices were in use and open to the public at the time of the complainant's invention.

Tenth. That complainant has sustained no actual damages by reason of defendant's infringement.

Eleventh. That defendant has derived no profits or gains from the use of complainant's invention.

Your master therefore reports that complainant is only entitled to nominal damages with costs.

All of which is respectfully submitted.

SMITH H. SHANNON, *Master.*

704 *Complainant's Exceptions to Master's Report.*

In the Circuit Court of the United States for the Western District of Pennsylvania.

ARTHUR KIRK
vs.
JOHN E. DU BOIS. } No. 39. November Term, 1886. In Equity.

On accounting.

Complainant's exceptions to master's report.

And now, to wit, July 5th, 1890, the complainant, by his counsel, excepts to the findings of the master, S. H. Shannon, Esq., in this case as follows:

I. The master erred in finding only nominal damages for the complainant.

II. The master erred in not finding as matter of law that the measure of profits was the price respondent must have paid for equivalent means for accomplishing an equally beneficial result with complainant's device.

III. The master erred in not finding as matter of law that the respondent in the selection of such equivalent means is restricted to such means as are open to the public and known at the date of complainant's patent.

IV. The master erred in not finding as matter of fact that the only equivalent means for accomplishing equally beneficial results with complainant's device was manual attention during the period of the use of the dams.

V. The master erred in not finding that said manual attention would have cost the respondent the sum of $21,546.

VI. The master erred in not finding as matter of law that the respondent, having elected to use a relieving device, was estopped from asserting that such election was unprofitable and was estopped from showing what his position would have been if he had
705 used no relieving device of any description.

VII. The master erred as matter of law in not finding that any relieving or open sluice extending from under the gates, so as to relieve them from unnecessary pressure, is an invasion of the sixth claim of complainant's patent, irrespective of the form, place, or details of construction of said sluice.

VIII. The master erred as matter of law and fact in deciding that the cost of replacing the lower leaf of the bear trap, if swept out, solely constituted respondent's savings from the use of the patented invention.

IX. The master erred in admitting testimony as to the sufficiency of side stops on the walls of the chute and transverse bars on the under side of the upper leaf of the bear trap.

X. The master erred in finding as matter of fact that side stops on the respondent's dams are sufficient to withstand all pressure

brought upon the leaves of the dams and afford as adequate protection to the dams as complainant's automatic relieving device.

XI. The master erred as matter of law in deciding that complainant must apportion the profits resulting from the use of his invention with the profits resulting from the use of side stops on the walls of the chute and tran-verse bars on the under side of the upper leaf of the bear trap.

XII. The master erred as matter of fact in finding that "cocking the wickets" was known before the date of the complainant's patent.

XIII. The master erred as matter of fact in construing the testimony of Arthur Kirk to be an admission that the pressure and height of water beneath the leaves of the bear trap can be controlled by the use of inlet and outlet wockets in the fore bay without manual attendance for said wickets.

XIV. The master erred in like manner as set forth at large in the above exception in construing the testimony of Thomas P. Roberts.

XV. The master erred as matter of fact in not giving due weight to the affidavit of John Du Bois filed on the application for a preliminary injunction in this case.

706 XVI. The master erred in not admitting the testimony prayed for in complainant's petition, dated Feb. 20th, 1890, and refused Feb. 21st, 1890.

Respectfully submitted,

WM. L. PIERCE,
W. BAKEWELL & SONS,
Of Comp.'s Counsel.

Pittsburgh, Pa.

And now, July 5th, 1890, the above exceptions on part of complainant having been presented before the master and having been argued, upon consideration thereof the same are hereby overruled by the master.

SMITH H. SHANNON, *Master.*

Filed with master July 5, 1890.

S. H. S.

Filed July 7, 1890.

H. D. GAMBLE, *Clerk.*

707 *Renewal of Exceptions to Master's Report by Complainant.*

In the Circuit Court of the United States for the Western District of Pennsylvania.

ARTHUR KIRK *vs.* JOHN E. DU BOIS. } No. 39. Nov. Term, 1886. In Equity.

And now, to wit, July 8th, 1890, the complainant, by his counsel, renews to the court each and every of the exceptions taken before

the master to the master's report on July 5th, 1890, by the complainant and which were overruled by said master.

WM. L. PIERCE,
Of Comp. Counsel.

Filed July 8, 1890.

H. D. GAMBLE, *Clerk.*

708 *Defendant's Exception to Master's Report and Renewal Thereof in Court.*

ARTHUR KIRK
vs.
JOHN E. DU BOIS. } No. 39. November Term, 1886.

PITTSBURGH, *July 5th*, 1890—2 p. m.

And now comes the above-named defendant, John E. Du Bois, by his counsel, and excepts to the master's report in the matter of accounting in above-entitled suit in equity, as follows:

First. The master erred in his finding on page 20 of his report, paragraph second, viz., "as to the use of floats as a means of regulating the wickets and controlling the pressure of the water under the leaves. The evidence as to their practical use and operation was so indefinite that your master will dismiss the subject without further comment." Whereas the Du Bois patent No. 229,682, taken in connection with "Exhibit Kirk Tracing" and the testimony offered both on behalf of complainant and defendant, prove clearly that floats were known and used efficiently and practically to operate, regulate, and control the wickets and the pressure of water under the leaves of bear-trap dams.

Second. The master erred in reporting at the close of his report that complainant is entitled to full costs.

JOHN E. DU BOIS,
By T. H. BAIRD PATTERSON.

And now, July 5th, 1890, the within exception on part of defendant having been filed with master, upon consideration thereof the same are hereby overruled.

SMITH H. SHANNON, *Master.*

And now, to wit, July 29, 1890, the defendant, by his counsel, renews to the court each and every of the exceptions taken before the master to the master's report on July 5, 1890, and which were overruled by the master.

T. H. BAIRD PATTERSON,
W. P. JENKS, *For Defendant.*

Filed July 7, 1890.

H. D. GAMBLE, *Clerk.*

709 *Additional Exception of Defendant to Master's Report, &c.*

In the Circuit Court of the United States for the Western District of Pennsylvania.

ARTHUR KIRK *vs.* JOHN E. DU BOIS. } No. 39. November Term, 1886. "On Accounting."

And now, August 6, 1890, the defendant, by his counsel, excepts to the rulings and the findings of the master, S. H. Shannon, Esq., in this case as follows:

Third. The master erred in finding "eighth, that complainant's device when used on bear-trap dams is capable of practically and successfully accomplishing this result" (viz., protecting same from injury), and in rejecting and disregarding testimony and evidence offered by defendant clearly establishing the negative of such finding.

W. P. JENKS,
T. H. BAIRD PATTERSON,
For Defendant.

Filed Aug. 6th, 1890.

H. D. GAMBLE, *Clerk.*

710 *Requests on Part of Defendant for Findings.*

In the Circuit Court of the United States for the Western District of Pennsylvania.

ARTHUR KIRK *vs.* JOHN E. DU BOIS, Assignee, Executor, and Legatee of John Du Bois, Deceased. } No. 39 of November Term, 1886. In Equity.

The court is respectfully requested to find:

First. The evidence shows that the plaintiff in his specifications claimed to be the first and original inventor or discoverer of a discharge opening controlled by a valve operated by a float of which he was not the original and first inventor, but which had been included in the patent of John Du Bois of the 6th of July, 1880, and not having filed a proper disclaimer as provided for in section 4917, R. S., he is barred under the provisions of section 973, R. S., from recovering any costs in this case.

Second. The plaintiff has furnished no data to estimate actual damages, and therefore in no aspect of the case can he recover more than nominal damages.

Third. That the defendant has proven that the device was not any actual value to him; that such uses as it is surmised might have been made of it did not profit him or save anything to him.

Fourth. The claim in plaintiff's patent sued on is for "an open sluice, waterway, or tail race, 38 Fig., 2, at such height as will permit all water which is not required to sustain the gates to escape from under them."

The evidence shows that such device is not useful, and therefore the patent is void.

711 Fifth. The evidence shows that sufficient openings to discharge the water from the fore bay and from under and to relieve pressure beneath the leaves had been known and publicly used in the United States more than two years before the plaintiff applied for his patent. The device was therefore not new and his patent for such device is void.

Sixth. That the openings in the upper and lower ends of the fore bay for the inflow and discharge of the water controlled by wickets to regulate that inflow and discharge is a full equivalent for the plaintiff's alleged invention.

Seventh. That openings as described in the fifth point had been publicly used in the United States more than two years before the plaintiff applied for his patent; that they had been publicly described and embraced in patents prior in date to the plaintiff's application for patent.

Eighth. That wasteways in dams and fore bays to be opened or closed by moveable boards or gates as necessity or convenience might require had been known and commonly and publicly used within the United States more than two years before the plaintiff's application for his patent.

Ninth. That the defendant by his patents of 1880, 1881, & 1882 as set forth in said patent, all antidating that of plaintiff, having devised and used in combination with his bear-trap dams, fore bay, inlet, and discharge flumes, gate valves, and wicket floats, and overflow chambers, he had the right to use each and every one of said devices, and to vary the form, place, and details of their several constructions so as to make them singly or in combination, up to the full measure of their mechanical adaptibility, effectual means in safely and efficiently operating the gates of bear-trap dams.

712 Tenth. That the alleged infringement of his sixth claim on which the plaintiff claims in this case is that the defendant built his fore bay at its lower end of a less height than on the sides, and provided grooves in which he placed boards to raise or lower this part of his fore bay as necessity or convenience might demand.

That if the plaintiff's patent will bear such a construction there can be no recovery, because the device, for the use of which this suit is brought, is fully embraced by an equivalent by permitting the water to escape before it shall pass under the gates, in the patent of John Du Bois of the 3rd of January, 1882 (which is prior in date to plaintiff's patent), in the following words: "In combination with the flexible dam, the flume *f*, and wickets, a discharge or overflow chamber arranged in connection with the flume substantially as shown." * * * "In combination with the dam A, flume B,

and means for retaining a head of water in the flume and beneath the dam, the overflow chamber provided with removable boards."

Also, "The inner side of the discharge or overflow chamber, from which the water flows to escape, is composed of a series of planks, seated upon one another in grooves in the frame. By adding planks to or removing them from the series the height of the overflow wall may be increased or diminished to any extent desired, and in this way the elevation of the water and the consequent elevation of the dam may be fixed at any point, it being manifest that as soon as the water reaches an elevation at which it can escape from the chamber the elevation of the dam will cease."

"Thus, it will be seen the head of the water is regulated previous to its reaching the gate, preventing the possibility of the latter receiving an excessive strain."

713 Eleventh. Under all the evidence in this case the plaintiff's bill should be dismissed.

Filed Jan'y 23, 1891.

H. D. GAMBLE, *Clerk.*

714 *Opinion on Exceptions to Master's Report.*

ARTHUR KIRK
v.
JOHN E. DU BOIS. } No. 39. November Term, 1886. In Equity.

Surexceptions to the master's report under the decree for an account.

ACHESON, *Cir. J.:*

At the former hearing the grounds of defence set up and relied on were fully considered and the conclusion reached that the plaintiff was entitled to an injunction and an account.

The views of the court upon the case as then presented are distinctly set forth in the opinion of Judge McKennan, 33 Fed. Rep., 252. No reason is perceived for doubting the soundness of that opinion; but our former decree is not now regularly open to review, even were it conceded (as the defendant earnestly contends) that new proofs were adduced before the master upon the accounting, which impunge the right of the plaintiff to maintain his bill. For if the defendant desired to reopen the question heretofore passed on by the court it was his business to apply for a rehearing, which, if granted at all, would have been upon terms securing to the plaintiff an opportunity of putting in additional rebutting evidence.

We turn, then, to the consideration of the only matters properly before us.

The plaintiff offered no evidence of any substantial damages sustained by him by reason of the defendant's infringement of the patent in suit, and the case before the master resolved itself into the question what profits or gains were made by the defendant from his use of the plaintiff's invention. The conclusion of the master was that the defendant had derived no such profits or gains, and there-

fore he found that the plaintiff is entitled to nominal damages only, with costs. The report of the master is able and exhaustive and relieves me from the necessity of discussing the case at any great length.

715 The plaintiff's invention relates to movable dams and consists of improvements therein merely. The claims of the patent are no less than ten in number, but the defendant's infringement was of one of them only, the sixth claim, namely, "A bear-trap dam having a relieving or open sluice extending from under the gates, so as to relieve them from unnecessary pressure, substantially as and for the purposes described." The operation of this relieving device is automatic, and the purpose is, when the water has reached a certain height or pressure under the gates, to permit all water not required to sustain the gates to escape from under them and prevent the lower leaf from being forced out from under the upper leaf, which would endanger and might wreck the dam. The bear-trap dam itself was an old and well-known structure, long in practical and successful use.

The plaintiff and his main witness testified in substance that to accomplish the beneficial result obtained by this relieving device, without its use, would require constant manual service—the employment of a skilled watchman day and night at each dam—the plaintiff estimating the cost of this manual labor at $1,500 a year for each dam; and upon that basis it was claimed that the defendant was chargeable with profits. No other evidence of profits or gains was offered; but it seems to me from the proofs that the plaintiff and his witness lacked practical knowledge of the working of bear-trap dams, at least as the same are used in the defendant's business. Their expressed views on this subject were largely conjectural and speculative, and I agree with the master that they are inadmissible as the basis for an accounting in this case. Corporation of New York *v.* Ransom, 23 How., 487. It is a familiar and well-settled principle that an infringer is liable only for profits or savings actually realized by him from the use of the patented invention and shown by clear and definite proof. Dean *v.* Mason, 20 How., 198; Philip *v.* Nock, 17 Wal., 460; Garretson *v.* Clark, 111 U. S., 120; Rude *v.* Westcott, 130 U. S., 152.

Now, the defendant's infringing dams were small bear-trap dams erected and maintained in a small, private, and unnavigable

716 stream, and were used exclusively for raising artificial floods for log-driving purposes, except two dams at the saw-mill, where a pool was maintained for floating and handling the logs. The height of the dams was but from 4½ to 5½ feet, the costs of construction of each dam only about $500, and the cost of replacing the lower leaf if swept away but from $25 to $30. In fact, the defendant's dams were provided each with side stops or cleats fastened on the sides of the dam or leaf chamber, which was an old protecting device; and the proofs are direct and clear that these side stops as used on the dams of the defendant were sufficient to withstand all pressure to which the gates of the dam were subjected, and that the side stops when used alone afford as adequate protection to the

defendant's dams as the plaintiff's automatic relieving device could do. Such in substance is the master's finding on this branch of the case, and it is fully justified by the proofs. The plaintiff's theory that the use of his automatic relieving device effected a saving to the defendant in the matter of manual service was completely overthrown by proved facts, and the evidence is strong and persuasive that the defendant realized no profits or saving whatever from its use.

There are other special findings of fact by the master going to sustain his general conclusion that the plaintiff is entitled only to nominal damages, which I will not discuss nor recite. It is enough for me to say that I am not convinced that there is any error in any of his findings. In the result reached by the master I fully concur.

Upon the subject of costs little need be said. I do not agree with the defendant's counsel that by virtue of section 973 of the Revised Statutes costs are to be denied the plaintiff for want of a partial disclaimer. The words found in the body of the specification, "If desired, the discharge opening may be controlled by a valve operated by a float," do not import that the patentee was the inventor of the float or its application to operate a valve, and certainly no such matter is embraced in any claim of the patent. The master, who was perfectly familiar with the course of the litigation as conducted before him, has included in his finding the allow-
717 ance of full costs to the plaintiff, and I am disposed to adopt his recommendation in that regard.

Let a final decree be drawn in accordance with the master's report.

Filed March 21, 1891.

H. D. GAMBLE, *Clerk.*

718 *Final Decree.*

In the Circuit Court of the United States for the Western District of Pennsylvania.

ARTHUR KIRK *vs.* JOHN E. DU BOIS. } No. 39. November Term, 1886. In Equity.

And now, to wit, May 9, 1891, this cause came on to be heard upon the report of Smith Shannon, Esq., the master to whom it was referred to ascertain and report the amount of gains and profits made by the defendant and the damages sustained by the complainant by reason of infringement of the letters patent of complainant upon which this suit is founded, which report was filed in the cause on the seventh day of July, 1890, whereupon, upon consideration thereof, it is ordered, adjudged, and decreed that the said master's report be confirmed and that the decree heretofore entered in this cause on December 31, 1887, be made final.

And it is further ordered, adjudged, and decreed that the said defendant pay to the said complainant the sum of six cents, the amount of profits and damages due to complainant, and that com-

plainant have execution for such sum, together with the costs of this suit, to be taxed by the clerk.

BY THE COURT.

Filed May 9, 1891.

H. D. GAMBLE, *Clerk.*

719 *Petition for Appeal of John E. Du Bois.*

In the Supreme Court of the United States.

JOHN E. DU BOIS, Defendant and Appellant,
vs.
ARTHUR KIRK, Complainant and Appellee.

To the Honorable the Supreme Court of the United States:

The appeal of John E. Du Bois, the above-named defendant, respectfully showeth—

That on the 4th day of October, A. D. 1886, Arthur Kirk, the above-named complainant and appellee, filed his bill of complaint in the circuit court of the United States for the western district of Pennsylvania, at No. 39, November term, 1886, against John E. Du Bois, the above-named defendant and appellant, to enjoin and restrain him, the said defendant and appellant, from infringing letters patent of the United States granted to the said complainant, Arthur Kirk, dated the 5th day of December, 1882, and numbered 268,411, for an improvement in movable dams and owned by said complainant and appellee, and also praying for an account and profits and assessment of damages arising from said infringement.

That a subpœna issued out of said circuit court and service thereof duly obtained upon the said defendant and appellant.

That said defendant and appellant filed his answer to said bill of complaint, to which the complainant and appellee filed a general replication.

Whereupon such proceedings were had in the cause that on the 9th day of May, A. D. 1891, a final decree was made and entered in said circuit court wherein it was in substance adjudged and decreed that the master's report be confirmed, and that the decree heretofore entered in this cause on December 31, 1887, be made final, thus enjoining defendant and appellant from infringing the sixth claim of complainant's letters patent, as was held to have been done, and adjudging to the said complainant the sum of six cents, the amount of profits and damages due to complainant, together with the costs of this suit, to be taxed by the clerk;

720 which said judgment and decree is, as this defendant and appellant is advised and believes, erroneous and ought to be reversed, and appellant herewith files some of his assignments of error.

Wherefore this defendant and appellant appeal from the whole of said decree of said circuit court to the Supreme Court of the United States and respectfully pray that the decree of the said circuit court and the record as directed by law and such copies, proofs,

entries, and papers on file, as may be necessary on the hearing of this appeal, shall be transmitted to the Supreme Court of the United States without delay, and that the said Supreme Court will proceed to hear the case anew, and that the said decree of the circuit court and every part thereof, so far as the same is erroneous, may be reversed or such other decree made as to said Supreme Court shall seem just.

JOHN E. DU BOIS.

GEORGE A. JENKS,
T. H. BAIRD PATTERSON,
Counsel of Appellant.

June 26th, 1891, appeal allowed.

M. W. ACHESON, *Cir. J.*

Filed June 26th, 1891,

H. D. GAMBLE, *Clerk.*

721 *Bond on Appeal of John E. Du Bois.*

In the Circuit Court of the United States for the Western District of Pennsylvania.

ARTHUR KIRK, Complainant and Appellee,
vs.
JOHN E. DU BOIS, Defendant and Appellant.

No. 39. November Term, 1886. In Equity.

Appeal to the Supreme Court of the United States.

Know all men by these presents — we, John E. Du Bois, of Du Bois, Clearfield county, Pa., and W. T. Wallace, of Pittsburgh, Allegheny Co., Pa., are held and firmly bound unto Arthur Kirk, the above-named complainant and appellee, in the sum of four thousand dollars, to be paid unto the said Arthur Kirk or assigns; to which payment, well and truly to be made, we bind ourselves and each of us, jointly and severally, and our and each of our heirs, executors, and administrators, firmly by these presents.

Sealed with our — this 25th day of June, 1891.

Whereas the above-named John E. Du Bois, defendant and appellant, has taken an appeal to the Supreme Court of the United States to reverse the decree entered in the above-entitled suit by the circuit court of the United States for the western district of Pennsylvania:

Now, therefore, the condition of this obligation is such that if the above John E. Du Bois shall prosecute his said appeal with effect and answer all costs and damages if he shall fail to make good his plea, then this obligation shall be void; otherwise to remain in full force and virtue.

JOHN E. DU BOIS. [SEAL.]
W. T. WALLACE. [SEAL.]

Sealed and delivered in presence of—
JAS. G. BELL.

722 UNITED STATES OF AMERICA,
Western District of Pennsylvania, } *ss:*
County of Allegheny,

W. T. Wallace, being duly sworn, deposes and says that he is a freeholder, residing in the city of Pittsburgh, and that he is worth the sum of four thousand dollars over and above all his just debts and liabilities.

W. T. WALLACE.

Sworn and subscribed this 25th day of June, 1891.

H. D. GAMBLE, *Clerk.*

June 26, 1891.—Bond approved.

M. W. ACHESON, *Cir. J.*

Filed June 26, 1891.

H. D. GAMBLE, *Clerk.*

723 *Assignment of Error on Appeal of John E. Du Bois.*

In the Supreme Court of the United States.

JOHN E. DU BOIS, Defendant and Appellant,
vs.
ARTHUR KIRK, Complainant and Appellee. } No. 39. November Term, 1886.

Appeal of John E. Du Bois from the circuit court of the western district of Penna.

First. The court erred in not entering decree in favor of the defendant for costs which accrued after the interlocutory decree.

Second. The court erred in not entering decree in favor of the defendant for all costs.

Third. The court — in entering the following interlocutory decree, viz., Arthur Kirk *versus* John E. Du Bois. Circuit court of the United States, western district of Pennsylvania. No. 39 of November term, 1886. In equity. And now, to wit, December 31st, 1887, this cause came on to be heard at this term on final hearing; and thereupon upon consideration thereof it is ordered, adjudged, and decreed that the letters patent in said complainant's bill mentioned, to wit, letters patent No. 258,411, dated December 5, 1882, for an improvement in movable dams which were issued to the said complainant are as to the sixth claim thereof (which was the only claim alleged by the complainant to have been infringed by the defendant) in all respects a good and valid patent; that the said complainant was the first and original inventor of the improvement in the said sixth claim of said letters patent described and claimed; that the said complainant is entitled to the exclusive right in and to said letters patent and in and to the invention and improvement secured thereby; that the said defendant by reason of the construction and use of movable dams containing the improvement set forth and claimed in the sixth claim of said letters patent No. 258,411, as in the said complainant's bill set forth, had infringed the said letter-

patent and has violated the exclusive rights of the said complainant thereunder, and that the said complainant do recover of
724 him, the said defendant, all gains and profits by him made and the damages sustained by complainant by reason of such infringement, as well as the costs and charges of this suit, to be duly taxed; and that it be referred to Smith H. Shannon, Esq., residing at Pittsburgh, as master, to ascertain the amount of such gains and profits and of the damages sustained by reason of such infringement; and further, that a writ of injunction, according to the prayer of said bill, be issued from and under the seal of this court restraining and enjoining the defendant and his agents, employees, servants, workmen, and all others acting by and under his authority from any further infringement of the said sixth claim of said letters patent and of the exclusive rights of said complainant thereunder; and it is further ordered that the complainant, on such accounting, have the right to cause an examinatton of said defendant, *ore tenus*, or otherwise, and also the production of the books, vouchers, and documents of the defendant, and that the said defendant attend for such purpose before said master from time to time as said master shall direct.

By the COURT:

Fourth. The court erred in decreeing that complainant's said letters patent "are, as to the sisth claim thereof, in all respects a good, valid patent; that the said complainant was the first and original inventor of the improvement in said sixth claim of said letters patent described and claimed."

Fifth. The court erred in decreeing "that the said defendant, by reason of the construction and use of movable dams contajning the improvement set forth and claimed in the sixth claim of said letters patent, No. 258,411, as in the said complainant's bill set forth, has infringed the letters patent and has violated the exclusive rights of the complainant thereunder;" when there is no evidence in the case tending to show that the defendant ever used an overflow or sluice at either the elevating or sustaining point or level or proving which of said points or levels is the location of complainant's patented relieving device.

Sisth. The court erred in entering the following final decree, viz:

"In the Circuit Court of the United States for the Western
725 District of Pennsylvania.

ARTHUR KIRK *vs.* JOHN E. DU BOIS. } No. 39. November Term, 1886. In Equity.

And now, to wit, May 9, A. D. 1891, this cause came on to be heard upon the report of Smith Shannon, Esq., the master to whom it was referred to ascertain and report the amount of gains and profits made by the defendant and the damages sustained by the complainant by reason of infringement of the letters patent of complainant

upon which this suit is founded, which report was filed in the cause on the seventh day of July, 1890; whereupon, upon consideration thereof, it is ordered, adjudged, and decreed that the said master's report be confirmed, and that the decree heretofore entered in this cause on December 31, 1887, be made final; and it is further ordered, adjudged, and decreed that the said defendant pay to the said complainant the sum of six cents, the amount of profits and damages due to complainant, and that complainant have execution for such, together with the costs of this suit, to be taxed by the clerk."

"BY THE COURT."

Seventh. The court erred in not dismissing the complainant's bill.

Which foregoing assignments of error appellant now and here specifies as some of the errors claimed.

JOHN E. DU BOIS,
Defendant and Appellant.

Filed June 26, 1891.

H. D GAMBLE, *Clerk.*

726 In the Supreme Court of the United States.

ARTHUR KIRK, Complainant and Appellant,
vs.
JOHN E. DU BOIS, Respondent and Appellee.

Cross-appeal of Arthur Kirk.

To the honorable the Supreme Court of the United States:

The appeal of Arthur Kirk, the above-named complainant and appellant, respectfully showeth—

That in the circuit court of the United States for the western district of Pennsylvania, at No. 39, November term, 1886, a suit in equity of Arthur Kirk against John E. Du Bois on the 9th day of May, 1891, a final decree was made and entered in said circuit court.

Such decree adjudged and decreed in substance that the master's report theretofore filed in said cause be confirmed, and that the interlocutory decree theretofore entered for an injunction on December 31st, 1887, be made final, and that the said complainant recover the sum of six cents as the amount of profits and damages due to complainant, together with the costs of said suit, to be taxed by the clerk; which said judgment and decree is, as this complainant and appellant is advised and believes, er-oneous and ought to be reversed, and appellant herewith files some of his assignments of error.

Wherefore this complainant and appellant appeals from the whole of said decree of said circuit court to the Supreme Court of the United States, and respectfully prays that the decree of the said circuit court and the record as directed by law, and such copies,

proofs, entries, and papers on file and exhibits as may be necessary on the hearing of this appeal shall be transmitted to the
727 Supreme Court of the United States without delay, and that the said Supreme Court will proceed to hear the case anew, and that the said decree of the circuit court and every part thereof so far as the same is er-oneous may be reversed, and such other decree made as to said Supreme Court shall seem just.

ARTHUR KIRK.

W. BAKEWELL & SONS,
WM. L. PIERCE,
Counsel for Appellant.

June 30th, 1891.—Appeal allowed.

M. W. ACHESON,
Cir. Judge.

Filed June 30th, 1891.

H. D. GAMBLE, *Clerk.*

728 *Bond on Cross-appeal.*

In the Circuit Court of the United States for the Western District of Pennsylvania.

ARTHUR KIRK, Complainant and Appellant,
vs.
JOHN E. DU BOIS, Respondent and Appellee.

No. 39. Nov. Term, 1886. In Equity.

Appeal to the Supreme Court of the United States.

Know all men by these presents that we, Arthur Kirk and John L. Kirk, both of Sharpsburgh, county of Allegheny and State of Pennsylvania, are held and firmly bound unto John E. Du Bois, the above-named respondent and appellee, in the sum of five hundred dollars, to be paid unto the said John E. Du Bois or his assigns; to which payment, well and truly to be made, we do bind ourselves and each of us, jointly and severally, and each of our heirs, executors, and administrators, firmly by these presents.

Sealed with our seals this 29th day of June, 1891.

Whereas the above-named Arthur Kirk, complainant and appellant, has taken an appeal to the Supreme Court of the United States to reverse the final decree entered in the above-entitled suit by the circuit court of the United States for the western district of Pennsylvania:

Now, therefore, the condition of this obligation is such that if the above Arthur Kirk shall prosecute his said appeal with effect and answer all costs if he shall fail to make good his plea, then this obligation shall be void; otherwise to remain in full force and virtue.

ARTHUR KIRK. [SEAL.]
JOHN L. KIRK. [SEAL.]

Signed, sealed, and delivered in the presence of—
JAS. G. BELL.

729 UNITED STATES OF AMERICA,
Western District of Pennsylvania,
County of Allegheny.

John L. Kirk, being duly sworn, deposes and says that he is a resident of Sharpsburgh, county of Allegheny and State of Pennsylvania, and that he is worth the sum of five hundred dollars over and above all his just debts and liabilities.

JOHN L. KIRK.

Sworn to and subscribed before me this 29th day of June, A. D. 1891.

H. D. GAMBLE, *Clerk.*

June 30th, 1891.—Bond approved.

M. W. ACHESON, *Cir. Judge.*

Filed June 30, 1891.

H. D. GAMBLE, *Clerk.*

730 *Assignments of Error on Cross-appeal.*

In the Supreme Court of the United States.

ARTHUR KIRK, Complainant and Appellant,
vs.
JOHN E. DU BOIS, Respondent and Appellee.
No. 39. November Term, 1886.

Cross-appeal of Arthur Kirk from the circuit court of the United States for the western district of Pennsylvania.

Assignment of Errors of Arthur Kirk, Appellant.

First. The court erred in not sustaining the following exception of complainant to the master's report, viz:

"The master erred in not finding as matter of law that the measure of profits was the price respondent must have paid for equivalent means for accomplishing an equally beneficial result with complainant's device."

Second. The court erred in not sustaining the following exception of complainant to the master's report, viz:

"The master erred in not finding as matter of law that the respondent, in the selection of such equivalent means, is restricted to such means as are open to the public and known at the date of complainant's patent."

Third. The court erred in not sustaining the following exception of complainant to the master's report, viz:

"The master erred in not finding as matter of fact that the only equivalent means for accomplishing equally beneficial results with complainant's device was manual attention during the period of the use of the dams."

Fourth. The court erred in not sustaining the following exception of complainant to the master's report, viz:

"The master erred in not finding that said manual attention would have cost the respondent the sum of $21,546."

731 Fifth. The court erred in not sustaining the following exception of complain-t to the master's report, viz:

"The master erred in not finding as matter of law that the respondent, having elected to use a relieving device, was estopped from asserting that such election was unprofitable and was estopped from showing what his position would have been if he had used no relieving device of any description."

Sixth. The court erred in not sustaining the following exception of complainant to the master's report, viz:

"The master erred in admitting testimony as to the sufficiency of side stops on the walls of the chute and transverse bars on the under side of the upper leaf of the bear trap."

Seventh. The court erred in not sustaining the following exception of complainant to the master's report, viz:

"The master erred as a matter of fact in finding that cocking the wickets was known before the date of the complainant's patent."

Eighth. The court erred in not sustaining the following exception of complain-t to the master's report, viz:

"The master erred as matter of fact in not giving due weight to the affidavit of John Du Bois, filed on the application for a preliminary injunction in this case."

Ninth. The court erred in not sustaining the following exception of complainant to the master's report, viz:

"The master erred in finding only nominal damages for the complainant."

Tenth. The court erred in finding that the testimony of complainant and his witnesses was "inadmissible as the basis for an accounting."

Eleventh. The court erred as matter of law in finding that side stops were a legal equivalent for the complainant's relieving device in assessing the respondent's profits.

Twelfth. The court erred in finding "that the defendant realized no profits or saving whatever" from the use of complainant's relieving device.

732 Thirteenth. The court erred in confirming the master's report.

Which foregoing assignments of error appellant now and here specifies as some of the errors claimed.

ARTHUR KIRK,
Complainant and Appellant.

733 In the Circuit Court of the United States for the Western District of Pennsylvania.

ARTHUR KIRK
v.
JOHN E. DU BOIS. } No. 39. Nov. Term, 1886.

WESTERN DISTRICT OF PENNSYLVANIA, *ss:*

I, H. D. Gamble, clerk of the circuit court of the United States for the said district, do hereby certify that the annexed and foregoing pages contain a true copy of the record and proceedings in the above-entitled case, so full and entire as the same remains of record and on file in my office.

Seal of the U. S. Circuit Court, W. D. Penna.

In testimony whereof I have hereunto signed my name and affixed the seal of the said court, at Pittsburgh, this 16th day of July, A. D. 1891.

H. D. GAMBLE, *Clerk.*

WESTERN DISTRICT OF PENNSYLVANIA, *ss:*

I, James H. Reed, judge holding the United States circuit court for said district, do hereby certify that H. D. Gamble, above named, was at the time of making the above certificate and is now clerk of the said court, and that the said certificate made by him is in due form of law.

J. H. REED,
Judge Holding Circuit Court.

Pittsburgh, July 16th, 1891.

734 UNITED STATES OF AMERICA, } *sct:*
Western District of Pennsylvania, }

To Arthur Kirk, Greeting:

You are hereby cited and admonished to be and appear at a Supreme Court of the United States, to be holden at Washington, D. C., within thirty days, pursuant to an appeal filed in the clerk's office of the United States circuit court, wherein John E. Du Bois is appellant and you are appellee, to show cause, if any there be, why the decree rendered against the said appellant as in the said appeal mentioned should not be corrected and why speedy justice should not be done to the parties in that behalf.

Witness my hand this 26th day of June, A. D. 1891.

[Seal of the U. S. Circuit Court, W. D. Penna.]

M. W. ACHESON,
Judge of U. S. Circuit Court.

Attest: H. D. GAMBLE, *Clerk.*

Service of above citation accepted June 27, 1891.

W. BAKEWELL & SONS,
For Complainant.

[Endorsed:] No. —. —— term, 18—. —— —— *vs.* —— ——. Citation.

735 UNITED STATES OF AMERICA, } *sct:*
Western District of Pennsylvania, }

To John E. Du Bois, Greeting:

You are hereby cited and admonished to be and appear at a Supreme Court of the United States to be holden at Washington, D. C., within thirty days, pursuant to an appeal filed in the clerk's office of the United States circuit court, wherein Arthur Kirk is appellant and you are appellee, to show cause, if any there be, why the decree rendered against the said appellant, as in the said appeal mentioned, should not be corrected and why speedy justice should not be done to the parties in that behalf.

Seal of the U. S. Circuit Court, W. D. Penna.

Witness my hand this 30th day of June, A. D. 1891.

M. W. ACHESON,
Judge of U. S. Circuit Court.

Attest: H. D. GAMBLE, *Clerk.*

Service of above citation accepted July 14, 1891.

T. H. BAIRD PATTERSON,
Counsel of Defendant.
G. A. JENKS,
Of Counsel for J. E. Du Bois.

[Endorsed:] No. —. —— term, 18—. —— —— *vs.* —— ——. Citation.

Endorsed on cover: Case No. 14,756. W. Pennsylvania C. C. U. S. No. 240. John E. Du Bois, appellant, *vs.* Arthur Kirk. Filed July 20, 1891.

SUPREME COURT OF THE UNITED STATES,

October Term, 1894,

NO. 240.

JOHN DuBOIS, Appellant,

vs.

ARTHUR KIRK.

APPEAL FROM THE CIRCUIT COURT OF THE UNITED STATES FOR THE WESTERN DISTRICT OF PENNSYLVANIA.

Statement of the Case.

On the 4th day of October, 1886, Arthur Kirk, the plaintiff and appellee, filed a bill in equity against John E. DuBois, the defendant and appellant, charging him with infringing the sixth claim of a patent, No. 268,411, which, on the 5th of December, 1882, had been issued to the plaintiff for "improvements in the construction of moveable locks and dams." He prayed for an account and an injunction. The defendant answered, denying the validity of the patent as to its sixth claim, and denying any infringement. The plaintiff filed a general replication.

On the 31st of December, 1887, an interlocutory decree was made sustaining the patent, declaring an infringement and ordering an account, and appointing a master to state the account.

The master reported, assessing nominal damages, (*R., P.* 451 *to* 460). On the 9th of May, 1893, the court confirmed the report of the master, adjudged the interlocutory decree

final, assessed the damages at six cents, and ordered the defendant to pay the costs.

The sixth claim of the plaintiff's patent, which is alleged to have been infringed, is, "A Bear-trap dam having a relieving or open sluice extending from under the gates so as to relieve them from unnecessary pressure, substantially as and for the purpose specified." (*R.*, *P.* 275.)

The alleged infringement by the defendant, as claimed by the plaintiff, was the lowering of the forebay wall of the dam at the lower end of the forebay, so that whenever the water in the forebay reached the height of the lowest part of the forebay walls, the excessive water above that height would waste into the stream below the dam.

On the 17th of January, 1884, the defendant purchased from his uncle, John DuBois, a property on which fifteen dams were erected. Of these, there were two with common chutes; eight with bear-trap chutes, which have the forebay of equal heights on all sides; and five that had bear-trap chutes in which the lower ends of the forebays were lower than the remaining three sides. After 1884, the defendant tore out two of the five, which were worn out, and built four new ones with bear-trap chutes and overflows at the lower ends of the forebays. This last class, numbering seven after the new erections, were those involved in the question of infringement, and account charged in this case.

The streams on which these dams were erected were small, unnavigable streams, from sixteen to about thirty-five feet wide, flowing through wide swamps, and flats with banks from three to five feet in height, which, as to some of the dams, had to be raised by artificial embankments, to confine the water in the streams, which streams were both very crooked and very sluggish; six feet of water in the streams would flood the surrounding country and completely flood out the dams. [See report of master, (*R.*, *P.* 452).]

The master has described the construction and operation of a bear-trap dam as follows:

"What are known as bear trap dams have been in use for a great many years. The dam consists of two movable leaves; the upper leaf overlapping slightly the lower one, hinged to timbers in the bed of the stream. These leaves are constructed of heavy timbers bolted together, and when they are down flat in the stream they constitute what is known as the chute of the dam. At the side of the leaves are constructed abutments, or forebays, extending the whole length of the dam, by means of which water is introduced under the leaves. In the forebay at each end are openings which are controlled by valves or wickets. From an opening in the forebay wall the water enters under the leaves of the dam. To raise the leaves of a bear-trap dam, the wicket in the upper end of the forebay is opened, permitting the water from the stream to enter the forebay and thence under the dam. To lower the dam, the upper wicket is closed and the lower one opened, and the water runs out of the dam. These wickets are also termed the inlet and outlet wickets. The injuries to a bear-trap dam, except the ordinary wear from age, use and injuries from floating logs, consists in the lower leaf being torn by the force of the water from under the upper leaf, thus wrecking the dam. This does not ordinarily injure the foundation of the dam, but merely the leaves. The object of complainant's device is to prevent the lower leaf from being swept out by relieving and limiting the pressure under the leaves and maintaining them at a certain fixed height, above which the water will exert no pressure upon them." (*R., PP.* 453 *and* 454.)

1st. The defendant denied that the sixth claim of the plaintiff was a patentable device, because it was only a waste-way, or waste-wier, and claimed it was not new at the time the plaintiff filed the application for his patent, but on the contrary had been well known and publicly used in dams, and was of common notoriety.

2d. That if it was patentable, it had been anticipated by a patent issued to John DuBois, No. 251,771, for which application was filed on the 11th day of November, 1881, and patent issued on the 3d day of January, 1882. (*R., P.* 267.)

3d. That it had been anticipated by a patent to John DuBois, No. 229,682, applied for on the 10th day of February, 1879, and patent issued July 6th, 1880.

4th. That it had been anticipated by the use of wickets, in locks and dams which were, as used, a full equivalent.

5th. That if the sixth claim of the plaintiff's patent be interpreted so as to embrace the alleged infringement in this case, that claim of the patent is void for uncertainty.

6th. If the sixth claim of the plaintiff's patent is valid, it was not infringed by the mere leaving of the lower end of the defendant's forebay lower than the remaining three sides.

7th. That the bill should be dismissed at the costs of the plaintiff on the grounds above stated.

8th. The defendant also contended that the costs after the interlocutory decree should have been imposed on the plaintiff.

Specifications of Error.

1st. The court erred in not entering decree in favor of the defendant for costs which accrued after the interlocutory decree.

2d. The court erred in not entering decree in favor of the defendant for all costs.

3d. The court erred in entering the following interlocutory decree, viz: Arthur Kirk *versus* John E. DuBois. Circuit Court of the United States, western district of Pennsylvania. No. 39 of November term, 1886. In equity. And now, to wit, December 31st, 1887, this cause came on to be heard at this term on final hearing; and thereupon upon consideration thereof it is ordered, adjudged, and decreed that the letters patent in said complainant's bill mentioned, to wit, letters patent No. 258,411, dated December 5, 1882, for an improvement in movable dams which were issued to the said complainant are as to the sixth claim thereof (which was the only claim alleged by the complainant to have been infringed by the defendant) in all respects a good and valid patent; that the said complainant was the first and original inventor of the improvement in the said sixth claim of said letters patent described and claimed; that the said complainant is entitled to the exclusive right in and to said letters patent and in and to the invention and improvement secured thereby; that the said defendant by reason of the construction and use of movable dams containing the improvement set forth and claimed in the sixth claim of said letters patent No. 258,411, as in the said complainant's bill set forth, had infringed the said letter patent and has violated the exclusive rights of the said complainant thereunder, and that the said complainant do recover of him, the said defendant, all gains and profits by him made and the damages sustained by complainant by reason of such infringement, as well as the costs and charges of this suit, to be duly taxed; and that it be referred to Smith H. Shannon, Esq., residing at Pittsburgh, as master, to ascertain the amount of such gains and profits and of the damages sustained by reason of such infringement; and further, that a writ of injunction, according to the prayer of said bill, be issued from and under the seal of this court restraining and enjoining the defendant and his agents, employees, servants, workmen and all others acting by and under his authority

from any further infringement of the said sixth claim of said letters patent and of the exclusive rights of said complainant thereunder; and it is further ordered that the complainant, on such accounting, have the right to cause an examination of said defendant, *ore tenus*, or otherwise, and also the production of the books, vouchers, and documents of the defendant, and that the said defendant attend for such purpose before said master from time to time as said master shall direct.

BY THE COURT.

4th. The court erred in decreeing that complainant's said letters patent "are, as to the sixth claim thereof, in all respects a good, valid patent; that the said complainant was the first and original inventor of the improvement in said sixth claim of said letters patent described and claimed."

5th. The court erred in decreeing "that the said defendant, by reason of the construction and use of movable dams containing the improvements set forth and claimed in the sixth claim of said letters patent, No. 258,411, as in said complainant's bill set forth, has infringed the letters patent, and has violated the exclusive rights of the complainant thereunder;" when there is no evidence in the case tending to show that the defendant ever used an overflow or sluice at either the elevating or sustaining point or level, or proving which of said points or levels is the location of complainant's patented relieving device.

6th. The court erred in entering the following final decree, viz:

"In the Circuit Court of the United States for the Western District of Pennsylvania.

ARTHUR KIRK *vs.* JOHN E. DUBOIS. } No. 39. Nov. Term, 1886. In Equity.

And now, to wit, May 9, A. D. 1891, this cause came on to be heard upon the report of Smith Shannon, Esq., the

master to whom it was referred to ascertain and report the amount of gains and profits made by the defendant and the damages sustained by the complainant by reason of infringement of the letters patent of complainant upon which this suit is founded, which report was filed in the cause on the seventh day of July, 1890; whereupon, upon consideration thereof, it is ordered, adjudged, and decreed that the said master's report be confirmed, and that the decree heretofore entered in this cause on December 31, 1887, be made final; and it is further order, adjudged and decreed that the said defendant pay to the said complainant the sum of six cents, the amount of profits and damages due to complainant, and that complainant have execution for such, together with the costs of this suit, to be taxed by the clerk."

"By the Court."

7th. The court erred in not dismissing the complainant's bill.

Brief of Argument.

I.

THE DEVICE ALLEGED TO HAVE BEEN INFRINGED IS NOT NEW.

The device alleged to have been infringed is the sixth claim of the plaintiff's patent. It is thus described by McKennan, J., in his opinion: "The patent covers ten claims, only one of which (the sixth) is alleged to have been infringed, and is therefore the subject of this controversy. That claim is in the following words: 'A bear-trap dam having a relieving or open sluice extending from under the gates so as to relieve them from unnecessary pressure substantially as and for the purpose described.' In the specification, this relieving device is thus described: 'In

the end wall of the dam, I make an open sluice, water-way, or tail-race, 38, Fig. 2, at such height as will permit all water which is not required to sustain the gates to escape from under them. When the gates are down as shown in Fig. 1, the water is admitted by the wickets under them. This raises and floats them up until they reach the position shown by Fig. 2. By that time the water, having reached the sluice, 38, which passes through the wall around the end of the gates will flow freely through, sustaining the gates at that level.' 'A modified construction of the sluice is shown by Fig. 4, where the outlet, 39, in the wall is below the level of the water, the latter passing through the outlet, 39, into a forebay or well, 40, and thence over the bridge, 41.'

"'It is apparent that the form, place and details of construction of the sluice for relieving the gates from excessive pressure below can be varied by the skilled constructor, but in all cases an open channel will be necessary when the water has reached a certain height or pressure under the gates.'" (*R., P.* 277 *Figures referred to R., P.* 272. *Original specification quoted from R., P.* 274.)

The alleged infringement claimed by the plaintiff as stated by the master is: "The defendant made use of the relieving device or method by lowering the end wall of the forebay wall to the height required." (*Master's Report R., P.* 454.)

This alleged infringement is illustrated by sketch A, Figs. 1, 2, 3, 4. (*Between R., PP.* 12 *and* 13.)

The overflow on Fig. 1 is the infringement charged. Fig. 3 represents the lower end of the forebay in defendant's dam as claimed by plaintiff and Fig. 4 the upper end of the forebay.

This lowering of the end wall of a forebay to permit the escape of surplus water beyond the limit needed to accomplish the purpose intended, is but a waste-way, waste-weir, waste-gate, waste-channel, or by-wash, all of which are

synonyms for the same thing. Perhaps the word waste-weir is most frequently used. In the first edition of Webster's Dictionary it is defined, "An overfall or weir for the superfluous water of a canal." Waste-gate, in the same edition, is defined, "A gate to let the water of a pond pass off when it is not wanted." In the International Dictionary of the same publication, "waste-weir" is defined, "An overfall or weir for the escape or overflow of superfluous water from a canal, reservoir, pond, or the like." In Rankine's Manual of Steam Engine and other Prime Movers, the fifth edition, published in 1870, which has been used as a standard in the United States for many years, at chapter 2d, page 97, under the heading of "Water power Engines in General," the waste-weir is thus described:

"PARTS AND APPENDAGES OF WATER-POWER ENGINES.—In every water-power engine in connection with it, there exists the following parts, or parts equivalent to them:

* * * * * * *

II. THE WASTE-CHANNEL, OR BY-WASH, whereby any flow of water which is in excess of that required for the stream and which there is not reservoir room to store, is discharged into the natural drainage channels of the country. This generally commences with a *weir or overfall forming part of the boundary of a reservoir*, and of such length that the greatest possible flow of waste water can escape over it without rising to a *dangerous or inconvenient height*."

The right to use only so much of the water of any stream as may be needed for the purpose intended, certainly is a common immemorial right. It cannot be reasonably contended, that when a dam is built, the builder must retain all the water of the stream, at all times, until it shall overflow all parts of his dam at the same time. He may build it lower at one part than at another, to permit useless excessive, and dangerous quantities of water to flow off. This right has been used so long that it certainly was a

matter of common knowledge before the appellee applied for his patent.

The same right has been equally well known to exist with reference to canals and forebays.

It is scarcely likely that any man of mature years and common intelligence, in any civilized country, within the last hundred years did not know that dams and forebays were built and used with one part of their walls lower than others for the very purpose of preventing an excess of pressure from unusual and unnecessary heads of water upon the machinery upon which it was intended to operate.

The many names which have been given to such lowering of the walls of a reservoir or forebay, testify forcibly to its existence as a well known device and its use. When these names have passed into standard mechanical works which describe the device and define the name, assuming the long continued and common use of the device, the evidence becomes conclusive. When to this it is added, that the personal consciousness of every intelligent man revolts at a claim that such device is or has been new within his lifetime it amounts to common knowledge. A waste-weir is not more uncommon in a dam than a door is to a complete house.

"Courts will generally take notice of whatever ought to be generally known within the limits of their jurisdiction." (1 *Vol. Greenleaf on Evidence, sec.* 6.)

"It is most unquestionable, that courts will take notice of what is within the common experience or knowledge of all men." (1 *Vol. Greenleaf on Evidence, sec.* 6 *a.*)

The alleged infringement is thus described by Anthony H. Trumble, plaintiff's first witness:

"Q. 13. What was the height of the upper end wall of the forebay? Ans. It was five feet higher than the lower end.

"Q. 14. What was the height of the lower end wall of the forebay, as compared with the elevation of the comb of the dam when raised? Ans. The lower end of the forebay was eight inches lower than the comb of the dam when up." (*R., P.* 14.)

That the lower end of the forebay was eight inches below the comb of the dam is the whole grievance complained of.

The fact is proven that there were slides in the lower end of the forebays in which loose boards could be, and generally were placed, so as to raise the lower end of the forebay when it was necessary to save the water.

This is precisely the same device that has been universally and notoriously used in dams for at least the lifetime of the oldest living man. The antiquity of waste-ways is proven by Mr. Kirk, the plaintiff, as follows:

"Q. 88. Is not the practice of diminishing the height of water in dams by opening of waste-ways and the removal of brackets a very ancient and well known one? Ans. As far as I know it has been used for a long time." (*R., P.* 241.)

The chutes of dams had long been constructed lower than the rest of the breast of the dams, and when it was desirable to save water, brackets or splash-boards had been put on to raise a higher head. In the construction of many dams, in addition to the lowered chutes, there was an additional waste-weir usually extending from the comb of the dam to the foundation which was closed by a gate or gates, brackets or splash-boards, as the waste-ways in the forebays in this case were closed.

If, instead of locating the waste-way in the forebay, Mr. DuBois had located it in the dam above the forebay, the same result would have been produced. The only ground that can be alleged to sustain the plaintiff's patent, is that

it was located in the forebay instead of the dam. But this ground is untenable. First, because waste-ways had been used immemorially in forebays and reservoirs as well as in dams. Second, because in any event the lowering of the down stream wall of the forebay, to permit the escape of surplus water, at most is but "the application of an old process or machine to a similar or analogous subject, with no change in the manner or application and no result substantially distinct in its nature."

In the case of the *Penn'a R. R. vs. Locomotive Truck Co.*, 110 *U. S.*, 490-494, it was held that such an application of an old process would "not sustain a patent even if the new form of result has not before been contemplated." The same principle is sustained by the cases of *Blake vs. San Francisco*, 113 *U. S.*, 679, and *Miller vs. Faree*, 116 *U. S.*, 22. Even in the matter of the lateral discharge of water directly from beneath the gates of bear-trap dams, the plaintiff's device had been anticipated. Josiah White, on the 19th day of October, A. D. 1819, took out letters-patent for dams of this description. (*R.*, *P.* 276.) One of these dams, at least, (the Pine Forest dam,) was so constructed that the tops of the gates when they were fully elevated, were so high above the breast of the dam as to permit the free discharge of the water laterally from beneath the gates. [See testimony of Hiram Woodward, (*R.*, *P.* 347, Q. and Ans. 268;) William Hawk, (*R.*, *P.* 373, Q. and Ans. 480.) Peter Evans, (*R.*, *P.* 351, Q. and Ans. 307;) Charles Robacker, (*R.*, *P.* 354, Q. and Ans. 331;) Jackson Hogle, (*R.*, *P.* 399, Q. and Ans. 435.)] It is submitted, therefore, that even in bear-trap dams plaintiff's machinery is wanting in novelty. Certain it is, that when the gates are so increased in length that when fully closed their tops are higher than the breast and abutments of the dam the lateral discharge of water from beneath the gates will be in proportion to the height of the apex of the gates above the breast and abutments.

II.

THE SIXTH CLAIM OF ARTHUR KIRK'S PATENT, NO. 268,411, IS PRIMA FACIE ANTICIPATED BY A PATENT TO JOHN DUBOIS, NO. 251,771, AS TO THE OVERFLOW AT THE LOWER END OF THE FOREBAY IN ADVANCE OF THE LEAVES OF THE DAM.

John DuBois' application for patent No. 251,771 was filed on the 11th day of November, 1881, and the patent was issued on the 3d of January, 1882. (*R.*, *P.* 267.)

Arthur Kirk's patent, No. 268,411, was applied for on the 31st of May, 1881, and the patent issued on the 5th of December, 1882. (*R.*, *P.* 271.)

On the 9th of November, 1881, the following letter was filed in behalf of John DuBois:

"John DuBois, locks and dams. November 9th, 1881.
Application for patent.

"Honorable Commissioner of Patents:

"SIR: The above-entitled application is a division of one heretofore filed by applicant and now involved in the interference of Kirk vs. DuBois. It will be seen on examination that the present case embraces only matters which are not involved in the interference and are neither shown nor described in the application of Kirk. In Kirk's case the only arrangements shown or described are those in which the water is first admitted beneath the dam and then permitted to escape through a separate overflow opening at the end of the same. This arrangement applicant expressly disclaims. It requires the construction of flumes at both ends of the dam, and is open to various other objections not necessary to enumerate.

"Respectfully submitted,

"PHILIP T. DODGE, Attorney."

(*R.*, P. 247-248.) After which the action in the patent office was as follows:

Room No. 43.

DEPARTMENT OF THE INTERIOR,
UNITED STANES PATENT OFFICE,

WASHINGTON, D. C., Dec. 1, 1881.

"Locks and dams." Filed Nov. 11th, 1881. Serial No. 45,622.

John DuBois, care P. T. Dodge, present:

In view of the fact that this application is carved out of a pending application showing the identical features and embracing a broad claim to the supply regulating features herein contained, this case should distinctly disclaim said feature, that no misunderstanding may exist should the other case go to patent.

T. C. TIPTON,
Ass't Ex. in Charge.

John DuBois. Locks and dams. No. 45,622. November 9, 1881. Application for Patent.

Honorable Commissioner of Patents:

SIR: I hereby amend by inserting immediately in advance of the claims the following:

"*I do not claim broadly herein the combination with a flexible dam, or gate of an overflow, by which the water can escape after reaching a fixed limit of elevation, the same constituting the subject matter of a prior application.*"

Respectfully submitted,

JOHN DUBOIS,
By P. T. Dodge, Attorney.

December 8, 1881.

Issue division. 45,622.

DEPARTMENT OF THE INTERIOR.
UNITED STATES PATENT OFFICE,

WASHINGTON, D. C., Dec. 12th, 1881,

John DuBois, care P. T. Dodge, city:

SIR: Your application for a patent for an improvement in locks and dams, filed November 11th, 1881, has been

examined and allowed. The final fee, twenty dollars, having been received, the letters patent will be forwarded in due order of business.

Additional copies of specifications and drawings will be charged for at the following rates: Single copies, uncertified, 25 cents; twenty copies or more, 10 cents each. The money should accompany the order.

Very respectfully,

V. T. STROCKBRIDGE,

(*R.*, *P.* 248-249. Acting Commissioner of Patents.

In due course of time the patent, 251,771, was issued to Mr. DuBois, in which the first claim was:

"1. In combination with a flexible dam or gate, having means for conducting and maintaining water thereunder, an overflow or discharge to limit the head of the water located at a point in advance of the gate, whereby the surplus water is permitted to escape before reaching the gate." (*R.*, *P.* 269.)

The specification describing fully the claim is as follows:

"The first part of my invention (for limiting water pressure beneath the gate or dam) consists in the use of an overflow or discharge opening arranged in the flume or supply chamber in advance of the gate or dam, and at such height as to permit the escape of the water past the gate without entering beneath the same, whenever the desired limit of pressure is reached. My invention in this regard is restricted to an arrangement wherein the head of the water is regulated before it passes beneath the gate or dam, as contradistinguished from a system wherein the water is first passed beneath the dam or gate and then permitted to escape through a safety outlet. By limiting the head of the water previous to its passage beneath the gates I am enabled to secure better results and to make use of a much more simple construction than is required when the water is first passed beneath the gate and then permitted to seek a safety outlet." (*R.*, *P.* 267.)

The claim and specifications thus found in the patent embrace precisely the waste-way in the forebay which is claimed to be an infringement in this case.

It appears from the file wrapper in the application of Arthur Kirk that on the 19th of April, 1881, John DuBois had applied for the patent No. 251,771. (*R.*, *P.* 207.)

On the 31st day of May, 1881, Kirk filed a caveat (*R.*, *P.* 206). On the 22nd of July, 1881, an interference was adjudged as follows:

"In combination with a flexible dam or gate, having means for conducting and maintaining water thereunder, an elevated overflow or discharge to limit the head of water passing beneath the dam."

"The above constitutes the first claim in the DuBois application, and is substantially the ninth claim of Kirk." (*R.*, *P.* 216.)

The final result of the proceedings on the interference was a division of the first claim of DuBois so as to limit his patent to the relief discharge in advance of the gates or leaves of the dam as now set forth in his patent above quoted.

The 9th claim of Kirk's patent was changed to the 6th claim, as set forth in his patent as follows:

"A bear-trap dam having a relieving or open sluice, *extending from under the gates*, so as to relieve them from unnecessary pressure, substantially as and for the purposes described." (*R.*, *P.* 232.)

The Commissioner of Patents, by his action in the interference, and in his final action, distinguished between relieving the pressure from under the gates after the water had passed under the gates, and preventing the pressure by a discharge of the surplus water in the forebay before it had passed under the gates and before it had given birth to the pressure.

The Kirk patent is a remedy for a disease. The DuBois patent is a prevention for the same disease. The difference between the DuBois patent and the Kirk patent is well stated in the following question and answer of Frank M. Reese, a mechanical expert:

"Q. 5. State whether or not you have examined and are familiar with the general principles of construction and mode of operation of the improved DuBois bear-trap dam No. 8, shown on this 'Exhibit Kirk Map,' and if so, compare the same with the invention claimed and set forth in Kirk's patent, under the sixth claim? A. I have examined Dam No. 8, whose position is set forth in 'Exhibit Kirk Map,' by figure 8, and understand the general principles of construction and operation of said dam. It is a bear-trap dam, consisting essentially of two gates or leaves, each hinged at one of their ends to a floor or foundation and so arranged relatively to each other that the inner end of the forward leaf overlaps the inner end of the lower leaf when the leaves are sunk down against the floor or foundation. These leaves work between side or end walls of the dam, formed of plank. A sluice or forebay is arranged at one side of the dam. This sluice is provided with wickets at its front and at its lower end. The lower end wall of the sluice is built up to a height about 15 or 18 inches below the height it is intended to raise the comb of the dam. An aperture extends along the inner wall of the sluice through into the chamber below the leaves or gates of the dam. This aperture is located at or near the level of the floor of the sluice, and extends, as near as I could judge, almost entirely the length of the chamber under the leaves. There are no other means attached to the dam to regulate its operation except the sluice I have mentioned. The rear end wall of this sluice is adjustable in height, so that by removing or replacing an upper board or boards thereof, the height of the rear end wall may be regulated as desired. The operation of the dam is as follows: The leaves or gates

being down the lower end wall is adjusted to any height which will give sufficient water to the flume, when the upper wicket is opened, to raise the leaves of the dam to any desired height. When the upper wicket is opened the water from the pool above enters the flume, rises therein, until it attains the height of the lower end wall. A portion passes through the lateral aperture in the inner wall of the dam into the chamber beneath the gates or leaves, and fills or rises within this chamber until it is of equal height with the column of water in the flume. When it is desired to lower the dam the upper wicket is shut, and the wicket at the lower end of the flume is opened. As compared with the invention described and claimed in the sixth claim of Kirk's patent, I think it is different, not only in mechanical construction, but also in principle of operation. The objects of the two inventions are in a manner different. The method of operation is different, and the only points of similarity between the two are, first, both dams are of the old bear-trap type of dam; second, both constructions are intended to achieve the same kind of result. The DuBois dam differs essentially from the Kirk dam in this: Unlike Kirk, DuBois never admits an excess of water under the leaves or gates of the dam, hence no necessity whatever exists in the DuBois dam for the use of any open tail-race or flume extending out from under the leaves to the pool below. As DuBois regulates his water in advance of the dam and only permits the requisite water to enter under the leaves that is required to raise them to any given height, there is no surplus water to carry away from this chamber. On the other hand, as Kirk's dam, like other previous bear-trap dams, admits an excess of water under the leaves, the open flume, tail-way or race is used and must be used in Kirk's dam, or it would be liable to the same excess or pressure that was apt to come upon the leaves of such dams. The difference—the marked difference—between the DuBois and Kirk dams, is this: DuBois prevents at all times by his construction,

any excess of water and consequently any excess of pressure from coming into the chamber under the leaves of the dam. DuBois' idea is to prevent; Kirk's is merely to cure." (*R. PP.* 58–59, 5th Q. and A.

III.

THE ARTHUR KIRK PATENT HAD BEEN ANTICIPATED BY THE PATENT OF JOHN DUBOIS, No 229,682.

The patent to John DuBois, No. 229,682, is found at *R., P.* 253. The application for it was filed on the 10th day of February, 1879. The patent was issued on the 6th day of July, 1880.

Mr. Kirk first conceived of his alleged device in December, 1879, as he claims in the interference proceedings between him and John DuBois, (*R., PP.* 223–224,) as follows:

"In December, 1879, I visited the movable dam in Bennett's Branch of the Susquehanna, near Benezette, in Elk county. While there, understanding the danger of injury to movable dams by the influx of too great a volume of water, I conceived my invention, that is, providing an outlet or escape for all water not needed to hold up the dam, and thus prevent any danger to the dam from excess of unnecessary pressure."

The fifth and sixth claims in the DuBois patent, No. 229,682, found, (*R., P.* 260) are:

"5. The combination of a jointed or flexible dam or lock-gate adapted to rise and fall beneath the water, a chamber or passage beneath the gate to admit water for elevating the same, *a secondary gate connecting with said chamber and controlling the escape of water therefrom below the gate, and a float located above the dam,* and arranged to operate the second gate.

"6. In combination with a jointed dam, B, and the water passage thereunder, the pivoted gate g', having pinion i', and the float located above the dam, and provided with a rack bar acting upon the pinion."

The specification and description of the devices set forth in the fifth and sixth claims, as applied to dams, are found at *R.*, *PP.* 256–257, and are:

"For the purpose of securing the elevation and depression of the dam a flume, f', is arranged to conduct water beneath it from the higher elevation of the stream above, and a flume, f'', arranged to *conduct the water from beneath the gate* into the stream below.

"A small gate or valve, g', located in the flume, f'', serves to control the escape of the water from beneath the dam-sections, and thereby controls the height of the dam, in the same manner that the height of the lock-gate is controlled.

"In order to control the valve or gate g' and the height of the dam automatically, I make use of a float, I, as shown in Figs. 1 and 6, mounted in the stream above the dam and provided with a rack-bar, h', moving upon a pinion i', on the gate-shaft. The rise and the fall of the water causes the float to rise and fall accordingly, and the float, in turn, opens and closes the gate, so as to render the escape of water from under the dam-sections proportionate to the height of water in the stream.

"While it is preferred to connect and arrange the float and gate g' in the manner shown, it is obvious that any other connection and arrangement may be adopted, provided the same results are attained, the essential feature of the invention in this regard consisting in the application of a float to control the passage of water beneath the gate-sections. By properly adjusting the float the falling of the water will cause it to partially or wholly close the gate g', and thereby cause the dam to rise until the water reaches the desired height, and when the stream rises above the desired level the float opens the gate g' and

causes the dam to fall until the level of the water is down to the desired point, thereby leaving the stream open to navigation, in the same manner as if no dam existed."

This describes an opening from under the leaves of the dam into a discharge flume which conducts the water from beneath the gates to the stream below.

The purpose of this opening is to control the height of the leaves of the dam. That height may be any desired height. If the dam is intended to be set at half the elevation of the full height of its leaves, this device properly adjusted will only allow enough upward pressure under the leaves to raise them to that height. If it be desired to raise the leaves to three-fourths the elevation, the proper adjustment of the device will raise, and hold the leaves by controlling the pressure of water under them to such an amount as will only raise and hold them to that height, and so by means of the opening from beneath the gates the pressure upon the leaves can be limited to any desired amount. If this device consisted of only the opening, without the gate or valve by which that opening might be closed or opened at pleasure, as need might demand, it would be literally the sixth claim of the Kirk device.

There is no specific height fixed at which the opening beneath the leaves is to be made either in the DuBois patent or in the Kirk patent.

Hence under the DuBois patent this opening would be placed at any height that a skilled contractor might judge it suitable to place it. He might judge it best in some instances and for some purposes to place it at the bottom of the flume, in other instances and for other purposes he might place the opening near the top. In fact he might place this opening at the very height, that might be selected by one who erects a discharge flume with an opening under the leaves of the dam for discharge of surplus water, would under the Kirk patent.

Such a selection of a place would be no infringement of the Kirk patent.

But it may be objected that the DuBois patent contemplated a gate or valve and not an opening. The erection of a gate implies necessarily an opening in which that gate is hung. A valve implies an opening to be closed or opened by the valve.

The fact that there was a gate or valve contemplated in the DuBois patent which at times might be used to close the opening, did not, at least in the judgment of Mr. Kirk, distinguish it from his patent; for in the specifications for his patent, (*R.*, P. 274,) it is thus described:

"In the end wall of the dam I make an open sluice, water-way, or tail-race, (38, Fig. 2,) at such height as will permit all water which is not required to sustain the gates to escape from under them. When the gates are down, as in the position shown in Fig. 1, the water is admitted by wickets under them. This raises and floats them up until they reach the position shown by Fig. 2. By that time, the water having reached the sluice (38) which passes through the wall around the end of the gate, will flow freely through, sustaining the gates at that level.

"*A modified construction of the sluice* (38) *is shown by Fig.* 4, *where the outlet* (39) *in the wall is below the level of the water, the latter passing through the outlet* (39) *into a forebay or well* (40) *and thence over the bridge* (41).

"If desired, the discharge opening may be controlled by a valve operated by a float.

"It is apparent that the form, place, and details of construction of the sluice for relieving the gates from excessive pressure below can be varied by the skilled constructor; but in all cases an open channel will be necessary when the water has reached a certain height or pressure under the gates."

That Arthur Kirk appreciated, that the sixth claim of his patent was but a repetition of the fifth and sixth claims of Mr. DuBois' patent, No. 229,682, is shown by his testimony in this case, given on the 27th day of November, 1888, as follows, (*R.*, *PP.* 289–290, Cross-Q. 71): "Will

you please state whether, when you used the words in your patent relating to the outlet or relieving sluice, 'If desired the discharge opening may be controlled by a valve operated by a float,' you meant it to be understood that a valve, if used in this way as indicated, was not a sufficient method of controlling the water under the gates, so that no undue pressure could obtain?

"This question, asked for *the* purpose of showing the plaintiff's knowledge of the prior state of the art, and also his knowledge of the character and efficiency of devices prior to his invention in regard to which he has testified in chief.

(Objected to by Mr. Bakewell, for plaintiff, as incompetent and irrelevant.)

"Ans. In the first place, I think that I never wrote this paragraph in the patent. I am sure that I did not. I never used it, but found it there. The clause in my patent covers the whole subject. 'It is apparent that the form, place and details of construction of the sluice for relieving the gates from excessive pressure below can be varied by the skilled constructor. But in all cases an open channel will be necessary when the water has reached a certain height or pressure under the gates.'"

It is respectfully submitted, that even if a waste-way or waste-weir was not substantially the same device for which Mr. Kirk claims in his sixth claim. the undisputedly earlier patent of John DuBois, No. 229,682, in its fifth and sixth claims anticipated it, and Mr. Kirk's sixth claim was not new.

The full capability of the discharge operated by a valve and float to relieve the gates, as set forth in the DuBois patent, is established by ample testimony among which is found that of Rulof Rulofson, a most intelligent expert with more than forty years actual, constant experience in building and operating dams and water works, who in answer to 32d question (*R.*, *PP.* 330–331) testifies: "32. Q. State whether you have both by long observation and knowledge

of what are known as floats? Ans. I was born in a lumbering country. In my boyhood days when I could steal from school or get a vacation, I worked around the mills; they used (my mother's people) a grist-mill, and saw-mill in connection; to regulate the water in the grist-mill they placed a float to control the height of water, and to prevent the shutting down of the saw-mill from time to time from causing the grist-mill from running too rapidly; at the age of twenty years I commenced to work and did my first day's work upon a wicket gate; at the end of one month I was given control of a shop, eight workmen, and the oversight of fourteen saw-mills; I continued for seven years to build mills, operate them for other men, grist-mills, fish ways and other water-works of a general character; since that time I have built all my own mills, built my own dams, have made my own drafts, and have always done the finer part of the work with my own hands. I have made it a rule to visit all improvements that were made, or being made, from Maine to Minnesota, and have endeavored to obtain a correct knowledge of them as far as reasonable, and upon this I base my knowledge. I would further state that we use floats to regulate the water in fishways. In short, I saw floats in operation at the DuBois dam, next above the fair ground, that fully convinced me of their practicability to govern and control with entire safety the leaves of any bear-trap dam made and constructed upon the principle used at DuBois."

IV.

THE SIXTH CLAIM OF ARTHUR KIRK'S PATENT HAD BEEN ANTICIPATED BY THE USE OF WICKETS IN LOCKS AND DAMS WHICH WERE A FULL EQUIVALENT.

"Authorities concur that the substantial equivalent of a thing, in the sense of the patent law, is the same as the

thing itself; so that if two devices do the same work in substantially the same way and accomplish substantially the same result, they are the same, even though they differ in name, form, or shape." (97 *U. S.*, 120.)

The infringement for which the plaintiff brought suit, was that the defendant in the construction of the forebays of seven of his dams left the lower end of the forebay "eight inches lower than the comb of the dam when up." (*R.*, *P.* 14.)

The plaintiff thus states how to construct the device contemplated by his sixth claim:

"Q. 42. What is the cost of applying to a bear-trap dam a relieving device such as described in your patent and claimed in your sixth claim? Ans. Practically nothing.

"Q. 43. Why is this so? Ans. It only requires the lower end of the forebay to be left that much lower than the comb of the dam when up." (*R.*, *P.* 287.)

The interlocutory decree is founded upon the fact that the depression of a part of the lower wall of the forebay of the appellant's dams was an infringement of appellee's device and was ~~infringed~~ embraced in his patent. (*R.*, *P.* 279.)

This is based upon the principle that freely communicating bodies of standing water maintain a common level.

The water in the forebay and that under the leaves of the dam, through the inlet opening under the leaves of the dam from the forebay, had free communication and remained at a common level.

Hence, if the water in a forebay was so controlled that it would only rise to a desired height, the pressure on the leaves of the dam would also be controlled at any given pressure desired by the operator.

The difference between the openings, by which the water is discharged from the forebay, called wickets, and the discharge by lowering the lower end wall of the forebay, is that the wickets discharged from near the bottom of the

forebay, and the lowering of the lower end of the forebay discharged it from near the top.

In either event, if the water is discharged, the result of a common level by either device is the same. If, then, by the use of the lower wicket, the water in the forebay can be held at any level which may be desired, it is a full equivalent of the plaintiff's device.

The water is admitted at the upper end of the forebay by a wicket which can be opened to admit only so much water as the operator may choose. If it is opened only an inch, it will admit only a flow of an inch of water at each side of the wicket opening. If the lower wicket is opened an inch at the same time, it will discharge all the water admitted at the upper wicket, if the water in the dam is at the same height as the water in the forebay. But the amount of water discharged through a given orifice is dependent upon the height of the level of the water above the orifice.

If, then, the head of water above the upper wicket is two feet when it is opened an inch, and the height of the water in the forebay is one foot at the same time, when both wickets are open, the water in the forebay will rise until it reaches the height of two feet, or near it, after which the inflow and outflow will be equal and the water in the forebay will stand at about the same level as that in the dam.

This illustration is not mathematically precise but may be sufficient to make it understood how, by opening the lower wicket in a proportion that it will, after the water in the forebay had reached a certain height, discharge as much as is admitted at the upper wicket, this adjustment of the wickets will retain the height of the water in the forebay at a predetermined height.

The proportion that the upper and lower wickets shall be severally opened to hold the water in the forebay at any given height can be calculated mathematically, or will

be learned very soon by observation and trial by anyone operating a dam.

But this setting of the wickets, does not in this case depend on theory, but was incontrovertibly proven, as a fact, to operate successfully long before Mr. Kirk claims to have conceived of his alleged device. Rulof Rulofson testified: (*R.*, *PP.* 329–330)

"26 Q. You can state whether or not by the use of the wickets the height of the leaves as well as the pressure of the water can be fully and adequately controlled in the bear-trap dam as erected upon the DuBois property?

"(Objected to as incompetent and irrelevant.)

"Ans. Yes. They can be retained at any place in the dam and be held stationary by the use of the wickets.

"27 Q. Please state whether or not by using that ordinary care, which men reasonably careful of their interests ordinarily use, the wickets of a bear-trap dam as used on the DuBois property furnish an adequate and sufficient means both to control the height of the leaves as well as the pressure of the water under them? Ans. I believe I am able to demonstrate that every principle required or necessary to sustain such dams at their full height, as well as to relieve the pressure from the under leaf is vested in the two wickets by which they are operated."

George W. Edwards testified (*R.*, *P.* 238,) as follows:

"8 Q. You can state what power you have got to control the pressure of water and the height of the leaves of a bear-trap by use of wickets? Ans. I can raise the gates a foot, or two feet, and make them stand at that height, or I can raise it up to a foot of its full height and set the wickets and go home, and when I return in the morning it will be at the same height as I had left it, provided no person meddled with it. I refer to the two dams below the mill. I mean by those gates bear-trap gates."

The same capability to control the pressure on the leaves by the wickets is proven by John Horner, (*R.*, *P.*

344, Q. 24–25;) C. F. Fuller, (*R.*, P., 357, Q. 19-20;) Irvin Horn, (*R.*, P. 366, Q. 7;) C. C. Brenneman, (*R.*, P. 367, Q. 8;) Martin Hoover, (*R.*, P. 368, Q. 6.)

William Hawk began to attend bear-trap dams in the Lehigh river in 1854, and attended them five or six years. He testifiss (*R.*, P. 374, Q. 14·)

"14 Q. You can state what power you had to control the pressure of water when under the gates, and how you regulated the height of the gates? Ans. We regulated the height by means of the wickets. We could lower the gate either one foot or two, or any distance we desired, and stop them; that was what we called cocking the gates: and the gates would stand at the height we put them as long as there was water in the pond."

Hiram Woodward, who was familiar with bear-trap dams on the Lehigh river from 1844 to 1854, testifies substantially to the same effect as William Hawk, (*R.*, P. 348, Q. 12–13–14;) also William Woodward, (*R.*, P. 350, Q. 5;) Peter Evans, (*R.*, P. 351, Q. 8;) Charles Robacker, (*R.*, *P.* 354, Q. 11.)

The Master in his report finds on this subject as follows: (*R.*, *P.* 458–459.)

"The next device which defendant sets up is that of controlling the leaves of the dam by means of the wickets in the forebay, called 'cocking the wickets'.

"This operation may be described as adjusting the wickets in the forebay so that the water discharged by the lower or outlet wicket shall equal that admitted by the upper or inlet wicket, so that the dam will remain stationary. It consists in so regulating the wickets that the pressure under the leaves will remain uniform. The wickets or valves of the dam are no part of complainant's invention; nor are the forebays.

"The complainant admits (*X. Int.* 97) that the pressure and height of water beneath the leaves of bear-trap dams can be controlled by the use of inlet and outlet wickets.

"Col. Thomas P. Roberts, complainant's witness, testifies to the same (*X. Int.* 200); and the defendant has proven the same fact.

"The testimony of defendant and his witnesses is that this can be practically and successfully done, and has been used by the defendant. The master is of the opinion that evidence sufficient to establish this fact was given by the testimony of C. F. Fuller, John Horner, Rulof Rulofson and others."

His ninth finding of fact (*R.*, *P.* 468,) is as follows:

"Ninth. That side stops or cleats nailed on the side of the dam or leaf chamber, transverse bars on the lower edge of the upper leaf, the use of the wickets in the forebay in controlling the leaf of the dam, are devices or methods capable of protecting the leaves of bear-trap dams, and will accomplish this result on bear-trap dams as used and constructed by defendant as adequately as complainant's relieving device, and that these devices were in use and open to the public at the time of the complainant's invention."

Atchison, J., in the opinion, (*R.*, *P.* 468,) speaking of the findings of the master, declares:

"There are no other special findings of fact by the master going to sustain his general conclusion that the plaintiff is entitled only to nominal damages, which I will not discuss nor recite. It is enough for me to say that I am not convinced that there is any error in any of his findings. In the results reached by the master I fully concur."

That the wickets always were an equivalent is further sustained by the testimony of Arthur Kirk, the appellee, (*R.*, *P.* 290) Cross Int. 74 to 81, as follows:

"×Int. 74. Is what is called a bear-trap dam, part of a dam or part of a chute, or is it what is called a species of water motor? Ans. It is a part of the whole of a dam. It is not what I call a water motor.

"×Int. 75. A forebay is not a new device at all? Ans. It is not by any means.

"×Int. 76. How is water let in the forebay? Ans. By opening a wicket at the upper end of it.

"×Int. 77. How is the water let out of the forebay? Ans. By a wicket at the lower end.

"×Int. 78. Were there not two wickets to let the water in and two to let it out. Is there not often? Ans. There may be two or more.

"×Int. 79. Could you not control the height of the gates by the use of the wickets in the forebay? Ans. Yes, sir; it can be.

"×Int. 80. Could you not control the height of water in the forebay by the use of wickets? Ans. It could be.

"×Int. 81. Has it not always been that you could control the height of the gates, and the height of the water in the forebay by the use of wickets? Ans. It could always be done."

One form of the Kirk device, as stated in his specifications, (*R.*, *P.* 274,) is: "A modified construction of the sluice (38) is shown by Fig. 4, where the outlet (39) in the wall is below the level of the water, the latter passing through the outlet (39) into a forebay or well, (40,) and thence over the bridge (41.)

"If desired, the discharge opening may be controlled by a valve operated by a float."

This discharges below the level of the water. It controls the discharge by a valve in that discharge opening. This is precisely what is and has been done by the wicket in every bear-trap dam.

The valve is operated by a float just as the valve in the wicket had been done before Kirk conceived of his patent.

The only difference, then, between the wicket and the Kirk device, is that the one discharges the water from a forebay at one side of the leaves and the other from a forebay at the other side.

V.

IF THE SIXTH CLAIM OF APPELLEE'S PATENT IS INTERPRETED SO AS TO EMBRACE THE ALLEGED INFRINGEMENT, IN THIS CASE, THAT CLAIM OF THE PATENT IS VOID FOR GENERALITY AS AN ALL-EMBRACING CLAIM.

In the case of *Carlton vs. Bokee*, 17*th Wallace*, 471, the expansion of a simple invention into an all-embracing claim is reprobated. Taney, C. J., delivering the opinion, says: "We think it proper to reiterate our disapprobation of these ingenious attempts to expand a simple invention of a distinct device into an all-embracing claim, calculated by its wide generalizations and imbiguous language to discourage further invention in the same department of industry, and to cover antecedent inventions."

See also *O'Reiley vs. Morse*, 15*th Howard*, 112–113.

The district court interpreted the sixth claim of appellee's patent, to embrace within its terms, the lowering of one end of a forebay, to permit the escape of useless water. Such waste-ways for the purpose of avoiding damages and inconvenience are indispensable in almost all dams, forebays, and water motors. The forebay intended to furnish water to raise the leaves of a bear-trap dam is substantially like any other forebay. If a waste-way to discharge the surplus water in such a forebay is an infringement, a like discharge in the forebay of a grist-mill, saw-mill, or factory would also be an infringement of appellee's patent. As equivalents, the waste-weirs in dams which permitted the water to escape before it passed into a forebay, and thereby kept unnecessary water from passing into the forebay, would also be embraced within the scope of the patent.

Chutes in dams are made lower than the other parts of the dams, and the same patent would embrace the lowering of a part of the dam to construct a chute.

The state of the art, before appellee conceived of or applied for his patent, shows that waste-ways and chutes in every form of modification, had been used of common right, in all the different forms of water motors. If appellee's sixth claim is interpreted to embrace, or by its generality does embrace, "the whole subject," as stated by Mr. Kirk, (*R.*, *P.* 290,) it certainly comes within the principle above quoted, and "covers" many ~~anticipated~~ antecedent inventions."

In addition to the ~~anticipated~~ antecedent inventions mentioned, there appears in the evidence one especially applicable to bear-trap dams which has been publicly used in what was known as the Pine Forest dam as early as 1840, and for many years thereafter, which seems to be substantially identical with the appellee's sixth claim. In the construction of that dam the leaves were made of such length that when elevated their apex was from eighteen inches to two feet above the side walls of the dam, and thereby left an opening under the leaves, between the top of the side walls and the under side of the leaves, when up, through which the water could freely discharge. This is the open space described in the appellee's patent. This construction of the dam is proven by Hiram Woodward, (*R.*, *P.* 347 :)

"8. Q. State when elevated how high the leaves reached with regard to the abutments or the breast of the dam ? Ans. The top of the leaf when up was above the overflow of the dam about eighteen inches."

William Woodward testified, (*R.*, *P.* 350 :)

"3. Q. You can state when the leaves were fully elevated by the opening of the upper wicket and the closing of the lower one what its height was in reference to the breast of the dam ? Ans. I should say that the leaves were about fifteen (15) to twenty (20) inches above the breast of the dam "

Charles Robaker testifies, (*R.*, *P.* 354) :

"9 Q. You can state how high the apex of the leaves rose above the breast of the dam ? Ans. About eighteen

(18) inches. The reason I know this is by seeing the top of the gate while I was up on the dam about eighty (80) rods, and the water was pouring over the breast of the dam, and I saw the top of the leaves about a foot or more and the water was not pouring over them. I could see them plainly."

William Hawk testified (*R.*, *P.* 373):

"6. Q. How high when the gate was fully up, was the upper leaf above the breast of the dam? Ans. About two feet.

"7. Q. Can you state what dam was this you speak of? Ans. The Pine Forest dam, on the Lehigh river."

VI.

IF THE SIXTH CLAIM OF APPELLEE'S PATENT IS VALID, IT IS NOT INFRINGED BY THE MERE LEAVING THE LOWER END OF THE DEFENDANT'S FOREBAY LOWER THAN THE THREE REMAINING SIDES.

The alleged invention of the appellant, if it is an invention, is certainly a very trivial one. To permit water to escape, when it exists in unnecessary or dangerous quantities, would be suggested by a grade of intellect, or intelligence, little above animal instinct.

To knock off a board or cut a hole in a forebay or reservoir, to remove the pressure of water, would be done as a matter of course, if such pressure was likely to be harmful. Unless there was something novel in the place the opening was to be cut, in the appellee's device, or something peculiar in the form of the opening, or some special use to be made of the opening, such a device would not be patentable. There is nothing new or special about the use of the opening invented by the appellee, for open-

ings as such have been always used to discharge surplus water, where such water exists. There is nothing new or peculiar about the form of the appellee's opening or sluice, as any form is sufficiently adequate to discharge water. Then, if there is any novelty in the device, it must be in the place at which it is located.

There is nothing new as to the height of the location, for by his specifications he states it may be either under the water or at a point near the surface of the water.

The claim limits the opening to being from under the leaves, and on the side of the forebay wall, if the claim is restricted to what is claimed, strictly, then the discharge in the lower end of appellant's forebay does not come from under the leaves and is not within the scope of appellee's patent

It is only by extending the language beyond its ordinary meaning, that the claim is made to include waste-ways, chutes, and other means of discharging unnecessary water. The claim for such a device should not be extended by construction. In the case of *Atlantic Works vs Brady*, 107 *U. S.* 200, it is ruled: "The design of the patent laws is to reward those who make some substantial discovery or invention, which adds to our knowledge and makes a step in advance in the useful arts. Such inventors are worthy of all favors. It was never the object of those laws to grant a monopoly for every trifling device, every shadow of a shade of an idea, which would naturally and spontaneously occur to any skilled mechanic or operator in the ordinary progress of manufactures. Such an indiscriminate creation of exclusive privileges tends rather to obstruct than to stimulate invention. It creates a class of speculative schemers who make it their business to watch the advancing wave of improvement, and gather its foam in the form of patented monopolies, which enable them to levy a heavy tax upon the industry of the country, without contributing anything to real advancement of the arts. It embarrasses the honest pursuit of business with fears

and apprehensions of concealed liens and unknown liabilities to law-suits and vexatious accountings for profits made in good faith."

It was incumbent on the plaintiff in the Circuit Court to prove the infringement. If the lower end of appellant's waste-way in the forebay did not prevent any substantial amount of pressure on the under side of the leaves, it would not be an infringement. The lower end of the forebay was but eight inches lower than the top of the leaves. When the water reached the top of the leaves, the water of the dam would have a full and free discharge the whole breadth of the leaves, and would raise the level of water below the dam, and diminish the pressure upon the leaves.

As the upper leaf extends over the lower some distance, the discharge, eight inches below the top of the leaves, would not be below the under side of the leaves more than one inch, and would not discharge any material amount of water that was under the leaves, which alone is the device as claimed by Mr. Kirk.

The most that could be said is, that, that discharge might reduce the pressure under the leaves less than eight inches. This conclusion is reached from the approximate result of the testimony of two witnesses, one of whom, William Layberger, (*R., P.* 441) stated the distance between the apex of the dam when elevated and the water beneath the leaves was about seven inches; and another, Thomas P. Roberts (*R., P.* 309) stated: "It would probably make the apex of the leaves about fourteen inches above the height of the water under the gate."

On these dams and all other bear trap dams, the evidence establishes without question, that side stops were fastened to the side walls of the leaves, at the line of the full elevation of the leaves, whereby the leaves were prevented from rising higher than their full elevation.

The side stops, the master has found, were an adequate protection to prevent the over-throw or damage to the leaves. See report of Master (*R., P.* 458); also his ninth

finding (*R., P.* 460) for the description of the side-stops and their effects.

It certainly is true that they would be more than sufficient to resist eight inches of pressure and beyond that eight inches the overflow of water over the leaves would afford a much more complete discharge for the water than the appellee's device would. In addition cross-bars were also used which also prevented the over-throw of the leaves.

The uselessness and frivolity of appellee's device is further indicated by the fact, which appears in the evidence, that the appellant had fifteen bear trap dams on his premises and eight out of the fifteen had all the sides of the fore bay of equal height, and had so used them for many years and these were found to be as little harmed by the pressure of the water under the leaves as those that had one of the sides of their forebays lower than the other sides. It would have cost "practically nothing" to have so constructed one of the sides of the fore bays. It was also proven by a large number of uncontradicted witnesses that the expense or attention needed to keep up and maintain the bear-trap dams that had no discharge from the forebays, was no greater than those that had such discharges.

These several lines of evidence with others of like character fully justified the conclusion reached by the Circuit Court, Atchison J., which was expressed as follows:

"The plaintiff and his main witness testified in substance that to accomplish the beneficial result obtained by this relieving device, without its use, would require constant manual service—the employment of a skilled watchman day and night at each dam—the plaintiff estimating the cost of this manual labor at $1,500 a year for each dam; and upon that basis it was claimed that the defendant was chargeable with profits. No other evidence of profits or gains was offered, but it seems to me from the proofs that the plaintiff and his witness lack practical knowledge

of the working of bear-trap dams, at least as the same are used in the defendant's business. Their expressed views on this subject were largely conjectural and speculative, and I agree with the master that they are inadmissible as the basis for an accounting in this case. *Corporation of New York v. Ransom*, 23 *How.*, 487. It is a familiar and well-settled principle that an infringer is liable only for profits or savings actually realized by him from the use of the patented invention and shown by clear and definite proof. *Dean v. Mason*, 20 *How.*, 198; *Philip v. Nock*, 17 *Wal.*, 460; *Garretson v. Clark*, 111 *U. S.*, 120; *Rude v. Westcott*, 130 *U. S.*, 152."

The plaintiff claimed that the amount of his damage was to be measured by what it would have cost the defendant to have used other means to produce the same result as he claimed would have been produced by his device.

The defendant replied to his claim, thus asserted, by evidence that there were other means than that of employing two men per day throughout the year for each dam to accomplish the same result, and that the other means employed by him could and would produce the same results without cost or expense.

To this the plaintiff attempted to rebut by all the evidence attainable, but substantially failed.

The issue presented by the plaintiff was, the actual value of his device by its results. The reply of defendant was, that in the existing state of the art, the device by its results was of no value at all, and the master in substance so found.

This evidence should have been considered by the Court in entering the final decree, and if on examination of all the evidence in the case it was manifest the alleged invention was not useful, the bill should have been dismissed.

It is ruled in the case of *Fourniquet v. Perkins*, 16 *Howard*, 82, "When a cause comes on for a hearing, on ex-

ceptions to a master's report, and for directions for a final decree, it is not irregular for the judge to reverse his decision, under which the reference was made, and dismiss the bill, if he thinks it ought to be dismissed. He is not obliged to enter a final decree which he believes to be erroneous."

The utter frivolity of the plaintiff's device is well established by the answer of Thomas P. Roberts, his principal witness, to ×Int. 211, (*R.* P. 308):

"×Int. 211. Suppose the bear-trap leaves were constructed of such length that they would considerably when at their full height, over-top the forebay or walls of the leaf chamber, or the breast of the dam and they were protected by sufficient side stops and the lower one by a crowbar firmly fastened to the under side of the upstream leaf near the top of said leaf, so that the under leaf in its upward pressure would be arrested by the side stop and cross-bar, would there be, under such circumstances, any considerable danger of the under leaf being swept from beneath the lap of the upper leaf?

"(Objected to as irrelevant.)

"Ans. Under the circumstances as stated, the under leaf could not be swept away."

In view of the facts that plaintiff's device is simply a waste-way, a device common to all dams, water motors and discharge flumes; of its anticipation in patents of John DuBois, particularly patent No. 229,682; of the adaptability of the forebay; the entire sufficiency of the inlet and outlet openings, communicating from the bottom of the forebay with the gate chamber beneath the gates; of the undisputed sufficiency of the wickets, as proven equivalents; of the entire absence of profits from the supposed use by defendant of what plaintiff claims as his device; of the known use and sufficiency of side stops; and of the state of the art; and other legitimate considerations;—on all the foregoing grounds, it is contended the appellee's bill should be dismissed at the cost of the appellee

VII.

IF THE PLAINTIFF HAD NO GROUND TO CLAIM ACTUAL DAMAGES AGAINST THE DEFENDANT, AND ENTAILED USELESS COSTS AFTER THE INTERLOCUTORY DECREE, HE SHOULD BE REQUIRED TO PAY SUCH COSTS.

In obedience to the injunction granted by the Circuit Court at the making of the interlocutory decree, the defendant closed the lower end of his forebays immediately.

The plaintiff should have known at the time he obtained the interlocutory decree, that the device certainly was of no value to the defendant.

He doubtless knew that the best testimony on that subject obtainable must be within the knowledge of those who were familiar with the construction and working of bear-trap dams.

The witnesses examined to prove damages in chief on part of plaintiff, were John E. DuBois, (*R.*, P. 280 *to* 286.) (He was not examined by plaintiff on any important matter relating to damages.)

Arthur Kirk (*R.*, *P.* 286 *to* 293.) He never built a bear-trap dam nor ever had any practical knowledge of the practical working of such dams; he never saw any such dams in practical operation. He, on brief visits, saw one dam at Benezette, two near Brookville, and those on the DuBois property.

Richard A. Roberts (*R.*, *P.* 293–296), who testified, (*R.*, *P.* 295), "I never saw a bear-trap dap."

Thomas P. Roberts (*R.*, *P.* 304–313), who is not shown to have had any experience in the construction of or working of bear-trap dams.

The whole testimony of the plaintiff was inferential, conjectural, and speculative.

The added fact that the plaintiff on the question of damages limited his testimony to those who knew nothing practically about bear-trap dams, when an abundance of testimony was accessible from persons who did know, suggests a very strong inference that he knew, or should have known, that he had no substantial ground on which to base his damages. Under such a state of facts, it is plain that in any event the costs after the interlocutory decree should have been imposed upon the plaintiff.

The case of *Dobson v. Hartford Carpet Company*, 114 *U. S.* 439-444, ruled in assessing damages on infringement of a patent, "The burden is upon the plaintiff and if he fails to give the necessary evidence, but resorts, instead, to inference and conjecture and speculation, he must fail for want of proof." The decree in that case 114 *U. S.* 447 was, "The final decrees in all of the suits are reversed, and the cases are remanded to the Circuit Court, with directions to disallow the award of damages in each suit, and to award six cents damages in each, and to allow the defendant's a recovery in each case for their costs after interlocutory decree, and to the Plaintiff in each case a recovery for its costs to and including interlocutory decree." In the case of *Dobson v. Dornan*, 118 *U. S.* 10–18 on substantially similar evidence, the same principle was reiterated and the same decree entered.

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Supreme Court of the United States

No. 240.—OCTOBER TERM, 1894.

JOHN E. DU BOIS,
Appellant,

vs.

ARTHUR KIRK,
Appellee.

APPEAL FROM THE CIRCUIT COURT OF THE UNITED STATES FOR THE WESTERN DISTRICT OF PENNSYLVANIA.

BRIEF FOR APPELLEE

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Supreme Court of the United States.

NO. 240. OCTOBER TERM, 1894.

JOHN E. DU BOIS, APPELLANT, Respondent,

vs.

ARTHUR KIRK, APPELLEE, Complainant.

APPEAL FROM THE CIRCUIT COURT OF THE UNITED STATES FOR THE WESTERN DISTRICT OF PENNSYLVANIA.

BRIEF FOR APPELLEE.

Statement of Case.

The bill is in the form usual in patent cases. It alleges the grant of complainant's patent, its infringement by the defendant, and prays for an injunction and an account of damages and profits.

The patent in suit, No. 268,411, was granted to Arthur Kirk, the appellee, on December 5, 1882, for an improvement in movable dams.

The following defenses are pleaded in the answer :

1. Inutility of the patented device.

2. Non-infringement.

3. Prior use of the patented invention by John Du Bois, the defendant's deceased uncle, by whose will defendant derives title to the dams alleged to infringe the patent in suit (Record, p. 62).

Proofs were taken by both parties, and on December 27, 1887, after arguments by counsel, the Court, Hon. W. McKENNAN, filed an opinion, in pursuance of which on December 31, 1887, a decree was entered sustaining the patent in suit, decreeing defendant to have infringed the sixth claim, awarding a perpetual injunction against the defendant, and appointing S. H. Shannon, Esq., Master, to take an account of damages and profits. The opinion is printed on page 277 of the record, and is published in 33 Fed. Rep., 252. A motion for reargument was heard on December 28, 1887, and was denied (Record, p. 3).

On July 7, 1890, the Master filed a report (Rec., p. 451), finding nominal damages for the complainant. After argument of exceptions, an opinion was rendered by his Honor Judge ACHESON, printed on page 466 of the Record, and published in 46 Federal Reporter, 486, affirming the Master's report, and thereupon a final decree was entered (Record, p. 468), to the effect that the patent was valid and had been infringed, and that the "defendant pay to the said complainant the "sum of six cents, the amount of damages and profits "due to complainant, and that complainant have execu- "tion for such sum, together with the costs of this suit,

" to be taxed by the Court." The allowance of costs to the plaintiff was in pursuance of a recommendation of the Master, the Court saying :

" The Master, who was perfectly familiar with the " course of the litigation as conducted before him has " included in his finding the allowance of full costs to " the plaintiff, and I am disposed to adopt his recom- " mendation in that regard."

Appeals from this decree were then taken by both parties. The complainant's appeal assigned error in the confirmation of the Master's report and in the Court's refusal to award substantial damages, but afterwards, and before the printing of the record in this Court, complainant's appeal was withdrawn, and the case is now before the Court solely on the appeal of the defendant DuBois.

The assignments of error filed by the appellant DuBois, as printed on page 471 of the Record, are, in substance, as follows :

1. That the Court erred in decreeing that the defendant pay the costs accruing after the interlocutory decree. This is the substance of the first and second assignments.

2. In decreeing that the sixth claim of the patent is valid (Appellant's third, fourth and sixth assignments).

3. In finding that the defendant infringed said claim " when there is no evidence in the case tending to " show that the defendant ever used an overflow or " sluice at either the elevating or sustaining point or " level, or proving which of said points or levels is the " location of complainant's patented relieving device " (Appellant's third, fifth and sixth assignments).

The Prior State of the Art.

The invention which is the subject of the patent in suit is decribed by complainant's (appellee's) expert, Ritter, on pages 141–145 of the record, beginning at the last paragraph on page 142.

The subject of the invention is an improvement in bear-trap dams. Bear-trap dams in themselves were old. They consisted essentially of two leaves or gates pivoted at their bases at opposite ends of a chute contained between vertical side walls, the upper leaf overlapping the lower one. At the side of this chute is a chamber called a forebay, open at the top and having walls at the sides and ends. It communicates with the space under the gates by an open hole in the side wall, communicates with the pool above the dam by a hole at the base of the upper end wall controlled by a wicket or valve, and communicates, also, with the stream below the dam by a wicket-controlled hole at the base of the lower end wall. When the dam is down, and the stream unobstructed, the gates lie in horizontal position, as shown in figure 1 of Kirk's Patent, in which *2* represents the upper gate and *3* the lower gate. To raise the dam, and thus to obstruct the stream, and to fill the pool above the dam, the operator closes the lower wicket and opens the upper one. The water then flows into the forebay, and thence, through the hole in the side wall, it flows beneath the gates, and by hydrostatic pressure it gradually raises the leaves until they assume the position of the legs of an inverted V, as shown in figure 2 of Kirk's Patent. To lower the dam the operator closes the upper wicket and opens the lower one, thus draining the water from the forebay and from the chamber under the dam, and causing

the gates to sink to the horizontal position shown in figure 1. The facility with which the dam can thus be raised and lowered by mere operation of the wickets, and without applying any mechanical lifting device to the gates, renders bear-trap dams frequently desirable. As used by defendant, they are employed for floating logs in a small stream. The dam is raised as above described, a large body of water is accumulated in the pool above the dam, logs are floated into the pool, and then, by suddenly lowering the gates to the degree desired, an out-rush or "splash" of water is caused, which sweeps the logs with it down the stream.

Prior to Kirk's invention, there was a difficulty in the operation of bear-trap dams which rendered them often dangerous to use. The water in elevating the gates exerts upon them a lifting force measured by the area of the gates multiplied by the difference between the level of the water in the forebay and the average level in the chamber under the gates. When the upper wicket was open, the level of the water in the forebay was necessarily the same as the level of the water in the pool above the dam ; and, as in times of high water this level is very considerably higher than that of the water under the dam, it is easy to see that an upward pressure might be exerted upon the leaves sufficient to bend them or to wash them from their foundations. Such accident would not only wreck the dam, but by letting out suddenly a huge body of water into the stream below might occasion a serious flood.

The facts above stated are illustrated in the drawing No 3 appended to this brief. As explained in the margin of this drawing, an average difference of three feet between the level of the water in the forebay and

the average level in the chamber under the dam would exert upon leaves each of which is of 450 square feet in area an upward pressure of 97,200 pounds.

To resist this hydrostatic pressure the common practice was to hold down the leaves by stops, cleats or chains, but the inefficiency of such devices is explained by complainant's witness, Thomas P. Roberts, a skilled hydraulic engineer, who says (Record, p. 17, Int. 9):

"Before the introduction of this relieving sluice, "when bear-trap dams became full, an enormous press- "ure was exerted on the upper and lower leaves, and "extending to the hinge on the upper leaf, sometimes "so great as to cause the lower leaf to fall over down- "stream. To prevent this, various devices have been "experimented with, such as chains to hold the leaves "on the floor. These chains, or other means of sup- "port, developed too much pressure at certain points; "concentrated the pressure at certain points, and con- "sequently the gates were liable to buckle or bulge, "with a tendency to rupture the hinge."

John Du Bois, the uncle of the appellant John E Du Bois, had, prior to Kirk's invention, recognized the difficulty to which we have called attention and had applied for a number of patents, in which he suggested various means for forcibly holding down the leaves of a bear-trap dam and resisting the excessive pressure liable to be exerted upon them. Thus, in Patent No. 236,488, dated January 11. 1881 (Rec., p. 262) John Du Bois described a bear-trap dam having a third leaf or apron hinged to the upper edge of the upper leaf, arranged to overlap the lower leaf, and connected to the foundation by a sliding connection which, in the language of the patent, "served to limit the movement "of the apron and prevent the gate from being raised

" too high. When the gate is at its highest elevation, " the apron should rest firmly on the top of the lower " section so as to give the dam increased strength " at the time of the greatest strain." In Patent No. 229,682, dated July 6, 1880 (Rec., p. 253), John Du Bois showed a bear-trap dam in which the two leaves were hinged together at the apex to prevent washing out of the lower leaf. He also states in this patent (Rec., p. 256) that " chains, rings sliding upon rods, or " other devices may be employed to prevent them [the " leaves] from separating ; " and that " it is necessary " that the hinges of the dam sections, and also the " hinges of the lock gates, shall be very strong." These devices, and others mentioned by Roberts in the passage quoted above were all designed, not to prevent the occurrence of excessive pressure, but to brace and strengthen the dam so as to resist such pressure. In the patent No. 251,771, granted to John Du Bois on January 3, 1882, (Record, p. 268), the patentee says: " Under the construction represented in my previous " Patents [those above mentioned] a possibility existed " of the gates being subjected to an excessive and " dangerous pressure in the event of the water above " the dam attaining an excessively high head or elevation."

The testimony is that John Du Bois had built near his saw-mill in the town of Du Bois a bear-trap dam having an overlapping third leaf designed to hold down the other leaves, and that on Christmas, 1879, the appellee Kirk having visited the dam at Du Bois' invitation, in company with a delegation of the Chamber of Commerce of Pittsburg, was struck with the clumsy and expensive nature of this contrivance, and suggested to some of the members of the company the

substance of the invention of the patent in suit, by which the necessity for all restraining devices is done away with. In the early part of the year following (Rec., p. 167) he described the invention to John Du Bois, who professed to Kirk that it was undesirable and useless, but was, in fact, so favorably impressed with the idea, that he not only put it into use at his dams, but surreptitiously filed an application for a patent, which, as we shall see, was put into interference with Kirk's application, the result of the interference being that Kirk was declared to be the first inventor and entitled to the patent, which was granted to him and is the patent in suit.

The following testimony proves the statements of the preceding paragraph:

B. F. Rynd, Rec., pp. 121, 122, Qs. 1–9; James Stedeford, Rec., pp. 180, 181, & p. 184, x-Qs. 43, 44; Capt. F. A. Mahan, Rec., p. 164, Qs. 10, 11; R. N. Spohn, Rec., p. 127, Q. 7; p. 129, x-Q. 25; E. F. Beugler, Rec., pp. 148, 149; N. G. Ayres, Rec., p. 130–132; D. M. Kirk, Rec., pp. 133–135; Arthur Kirk, Rec., pp. 166–168; Record of Interference in Pat. Office, Rec., pp. 214–224.

The Invention of the Patent in Suit.

In devices prior to Kirk's invention, the level of the water in the forebay and the level of the water in the upper pool when the dam was raised, were constantly the same, and when the dam was raised the leaves were subjected to the full hydrostatic pressure of the water in the upper pool.

Kirk conceived the idea of providing the dam with a self-acting overflow constituting a relieving or open

sluice, situate in the forebay or in the dam-chamber, so that the level of water in the forebay by which the dam-leaves are upheld is maintained at a lower level than the water in the upper pool, and that the upward pressure exerted upon the leaves is quite independent of the water level in the upper pool and is equally unaffected thereby, whether such level be low or be raised to an undue height by a freshet in the stream. By thus divorcing the body of water which controls the gates from the body of water backed up by the dam in the upper pool, a radical change is effected in the operation of bear-trap dams, all upward pressure upon the dam-leaves is relieved, stops, chains, third-leaves, and all restraining devices are rendered unnecessary, and by a simple constantly reliable appliance which is quite automatic and is quite independent of the wickets and other mechanism of the dam, the elevation of the leaves is controlled and the dam rendered safe in all stages of water, without involving any waste of the water in the upper pool.

The parts of the specification of the patent in suit in which this invention is described are found on pages 201 and 204 of the record, and are as follows:

(P. 201:) "My invention consists, * * * fifth, "of an open sluice, water-way or tail race, so ar- "ranged relatively to the dam that the water which "is not required to support the leaves will escape, "and so relieve the dam of all unnecessary press- "ure." * * *

(P. 204:) "In the end wall of the dam I make an "open sluice, water-way or tail race 38, Fig. 2, at such "height as will permit all water which is not required "to sustain the gates to escape from under them. "When the gates are down, as in the position shown "in Fig. 1, the water is admitted by the wickets under

" them. This raises and floats them up until they " reach the position shown by Fig. 2. By that time, " the water, having reached the sluice 38, which " passes through the wall around the end of the gate, " will flow freely through, sustaining the gates at that " level.

" A modified construction of the sluice 38 is shown " by Fig. 4, where the outlet 39 in the wall is below " the level of the water, the latter passing through the " outlet 39 into a fore bay or well 40, and thence over " the bridge 41.

" If desired, the discharge opening may be controlled " by a valve operated by a float.

" It is apparent that the form, place and details of " construction of the sluice for relieving the gates from " excessive pressure below can be varied by the skilled " constructor; but in all cases an open channel will be " necessary when the water has reached a certain height " or pressure under the gates."

The sixth claim, which defines the invention and which is the only claim of which infringement is charged, is:

" 6. A bear-trap dam having a relieving or open " sluice extending from under the gates, so as to re- " lieve them from unnecessary pressure, substantially " as and for the purposes described."

The invention described in the patent solves perfectly the problem of how to get rid of the undue lifting pressure exerted by the water in the upper pool without draining the upper pool itself.

Obviously, as suggested in appellant's brief, in small streams the water of the upper pool might be drained down to the height required to sustain the gates, but, as indicated in Du Bois' Patent No. 236,488 (Rec., p. 262), the necessity for economizing the water

in the pools of small streams would render it always undesirable.

There is certainly no analogy between the practice of draining the upper pool down below the apex of the dam, thus wasting the water and defeating the very purpose for which the dam is used, and Kirk's construction of the dam itself, in which a simple device in the dam reduces the level of the water under the gates, and within the fore-bay and dam chamber, only to the required height, without any loss of water other than the small quantity necessary to sustain the gates and to compensate for loss due to leakage.

Kirk accomplishes this by providing an overflow of water from under the dam, which reduces the water within the gates to a level lower than that of the upper pool, and but just high enough to raise the bear-trap gates, so that when they reach the desired elevation they are sustained and balanced without the exertion of any further hydrostatic pressure, while the level of the upper pool remains practically unchanged. In short, Kirk was the first to employ an overflow affording a water level of less height than the water level of the upper pool, and to apply to the gates a hydrostatic pressure only sufficient to raise them to the height predetermined by regulation of the level at which the water in the dam is permitted to escape. He was the first to get rid of the surplus pressure without wasting the water in the upper pool. This discovery was his invention, and the very simplicity of the means which he uses to reduce it to practice is one of its highest merits.

It is a significant fact, proving the utility and substantial novelty of the Kirk invention, that the defendant in no manner sought to dispute its utility until

after the interlocutory decree had been entered and the case referred to the Master for accounting. On the contrary, the testimony of defendant's witnesses is full of commendation of the merit of the patent overflow.

C. F. Fuller, one of defendant's principal witnesses, speaking of the operation of the Du Bois dam before the overflow was used, says (Record, p. 43):

"The dam bowed up in the centre by reason of "extra pressure of the water under the leaves, and "when the two planks were taken out [an overflow "from the fore-bay was thus constituted] the extra "water flowed out. * * * I showed Mr. Du Bois, "and then he thought that was just what we wanted to "get at. We went to experimenting then to see just "what point we had to cut the lower end of wall of "fore-bay, to see where to hold the gates and relieve "all undue pressure."

On page 44, he says: "It would make no difference "how high you would build the wall of lower end, "because the lower wall of fore-bay [the overflow] "regulates all undue pressure."

Defendant's expert Reese, on page 58, says, speaking of Kirk's invention:

"In his (Kirk's) dam, as in the use of the old well-"known types of bear-trap dams, the full head of the "water from the pool above the dam comes directly "into the chamber under the gates or leaves. Kirk's "object is to relieve any excess of pressure which "might come upon the leaves from the admission of "an excessive head of water under them."

On page 60 the same witness says:

"I have examined the affidavit and testimony [of "complainant's witness Roberts] and think that I "coincide with Mr. Roberts' views as to leakage, in-"dicated in the following portion of said affidavit.

" ' Referring to the drawing marked sketch of bear-
" ' trap dam, in Arthur Kirk's said affidavit, the dam
" ' was customarily raised, before the date of Kirk's
" ' alleged invention, by the admission of water from a
" ' fore bay or well through wickets, under the dam
" ' leaves or gates. The area of resistance presented
" ' by the leaves to the hydrostatic pressure of the water
" ' in the fore bay is enormous, relatively to the weight
" ' of the leaves, and upon the admission of water they
" ' rapidly respond to the pressure and rise to an up-
" ' right position. They could be checked when they
" ' had risen to a proper position either by turning the
" ' valves in the upper wall of the fore bay to diminish
" ' the flow of water into the fore bay from the pool
" ' above, or by partially closing the valves controlling
" ' the wickets leading trom the fore bay into the space
" ' between the gates. These modes, however, are im-
" ' practicable, or at least not economical, because they
" ' require the continued and careful attention of a man
" ' to the valve. If they should become closed or choked
" ' in any way to cut off the supply of water, the dam
" ' would fall.' "

In the patent application of John Du Bois, which was in interference with Kirk's application, the invention in issue in the interference is highly commended. In the specification of this application (Rec., pp. 209, 210), Du Bois says :

" The objects of the present invention are, first, to
" prevent the flexible gates or dam-sections from being
" subjected to an excessive or dangerous pressure of
" water from beneath. * * * The first part of my
" invention for limiting water pressure beneath the
" gates or dam, consists in the use of an overflow or
" discharge opening arranged in the flume or supply
" chamber [fore bay] at such height as to permit the es-
" cape of water by or past the gate whenever the de-
" sired limit of pressure is reached. * * * Under
" the construction represented in my previous patents

"a possibility existed of the gates being subjected to "an excessive and dangerous pressure in the event of "the water above the dam attaining an excessively high "head or elevation. * * * In the flume B [fore "bay], in advance of or above the bulkhead D, I form "a lateral discharge or overflow chamber H, through "the top of which the water may escape from the flume "or supply-chamber whenever the fixed limit of eleva- "tion is reached. * * * By adding additional "boards to, or removing boards from the series, the "height of the overflow wall may be increased or di- "minished to any extent desired, and in this way the "elevation of the water and the consequent elevation "of the dam may be fixed at any point desired, it being "manifest that, as soon as the water reaches an eleva- "tion at which it can escape through the chamber H, "the elevation of the dam will cease. Thus, it will be "seen, undue strain upon the dam is prevented and the "elevation of the same automatically checked at the "point desired.

"While it is preferred to construct the outlet chamber "in the manner shown, it is obvious that it may be mod- "ified in form and arrangement to any extent desired, "the only requirements being that there shall be an "overflow or outlet through which the water may es- "cape to relieve the dam from pressure whenever the "latter has reached the proper limit of elevation."

It is true that after the interlocutory decree, and after the Circuit Court had decided that the invention belonged to Kirk and not to Du Bois, the tone of defendant's testimony was changed, and in the evidence introduced by him before the Master he sought to belittle the invention. This, however, cannot diminish the effect of his praise of the patented device given at a time when self-interest did not lead him to criticize it unfavorably.

It is argued in appellant's brief that the sixth claim

of the patent in suit is too broad; that it lacks precision, and does not define the location and nature of the relieving device, so as to distinguish it from prior devices. But this argument is without merit. The claim is "A bear-trap dam having a relieving or open "sluice, extending from under the gates, so as to "relieve them from unnecessary pressure, substan- "tially as and for the purpose described," thus referring to the specification, which clearly states that the sluice is an overflow placed at such elevation as to cause the water to discharge when it reaches the proper height. It says, "In all cases an open channel will be "necessary when the water has reached a certain "height or pressure under the gates." The claim is to be read in the light of the specification, but in itself it indicates clearly the same thought which the specification expresses. The sluice could not be a "relieving "or open sluice" unless it were an elevated overflow, and the very term "sluice" imports the same idea. The clause "extending from under the gates" requires that the overflow shall be in communication with the gate-chamber—*i. e.*, it must be in the gate-chamber or in the forebay, which, as shown elsewhere, is really an integral part of the gate-chamber. This location of the overflow so that it shall lead from under the gates, and shall thus restrict the level of the water under the gates, is a novel and distinguishing feature of the invention, and is properly recited as such in the claim. There is no force in the suggestion that the obvious meaning of the specification is changed by the reference in the specification to the control of the relief opening by a valve operated by a float. A valve and float would hardly add to the practical value of the device, but the elevated overflow would operate in the same way

whether used with or without them and, as noted by Judge ACHESON in his opinion (Rec., p. 468), Kirk makes no claim to the use of a float or of a valve *per se*. The language under consideration is merely the suggestion of an addition which may or may not be used, but which is certainly not claimed.

Infringement.

The construction of defendant's dams is illustrated in two drawings printed opposite page 13 of the record and is described by complainant's witnesses Trimble, (Rec. pp. 13, 14), Roberts, (pp. 18, 19) and Ritter, (p. 142). In the same manner as in Kirk's device, the water in the defendant's fore-bay and in the chamber under the dam is maintained at the same level, lower than the apex of the interior of the dam-chamber and lower also than the level of the upper pool, and this is done substantially as described in the Kirk patent, by means of an open overflow which defendant makes by cutting down the lower end wall of the fore-bay.

Defendant's witnesses admit that the result of this construction is the same as the result of Kirk's construction and that the operations of both are the same, but they argue that there is no infringement because they say that Kirk's overflow is situate in the chamber under the leaves, whereas defendant's overflow is in the fore-bay.

Defendant's witness C. F. Fuller (Rec., p. 35), when asked by defendant's counsel how he regulates "the "height of the water and the pressure of the water under "the leaves of the [defendant's] dam" said: "We do "that by cutting down the partition or lower end wall "at the lower end of fore-bay, cutting it down about

" eighteen inches below the height to which they wish " to raise the leaves." * * * " Q. 11. State whether " or not the height of the column of water in the flume " or fore-bay controls or regulates the pressure of the " water under the gates of the dam ? A. It does."

On page 37 the witness Fuller gives his recollection of the conversation in which Kirk explained his invention to John Du Bois on Christmas, 1879, and says:

(Q. 23). "Ans. His [Du Bois'] reply was that he " would cut the partition or lower wall of the fore-bay " down to a certain height, which allows the water to " pass out through into the stream below. That would " be done in a much cheaper way than what Mr. Kirk's " method was, *and would have the same effect on the* " *dam.*"

On page 44 in answer to Q. 92, this witness says: " The lower wall of fore-bay regulates all undue " pressure."

Defendant's expert, Reese, says (Rec., p. 59) concerning the DuBois and Kirk constructions:

" Both constructions are intended to achieve the " same kind of result."

In view of these admissions as to the identity of operation of the Kirk and DuBois devices, the argument that the overflows are in different positions can have but little force, for both constructions are within the terms of the claim of the patent in suit. In defendant's dam, as in Kirk's, the chamber under the leaves and the chamber of the fore-bay are in effect one chamber; they are in constant communication with each other through a lateral opening at the base of the side wall (Defendant's witness Fuller, Rec., p. 36, Q. 12), the water is at the same level in both, and any in-

crease or diminution of the level in either chamber must immediately cause an exactly corresponding change of level in the other. It is, therefore, immaterial whether the overflow be put in the fore-bay chamber or in the chamber under the leaves; it may be in either of these chambers or at any place in either chamber, and the result will necessarily be the same. Wherever it is put in these places, it is necessarily an overflow, not from the upper pool, but "from under "the gates," because it communicates with the chamber under the gates and controls the level of water under the gates, and thus comes within the very letter of the sixth claim of the Kirk Patent.

The argument of defendant's expert that Kirk's device is a cure, while DuBois' is a prevention, therefore becomes a mere quibble of words; it affords no idea which is not repugnant to the plainest principles of hydraulics, that water in communicating chambers must stand at the same level, and that an overflow in one such chamber is necessarily an overflow for the other chamber (Testimony of Ritter, Rec., p. 145). Furthermore, in figure 4 of the patent in suit, there is illustrated a modification of the Kirk device, in which the overflow is situate in a lateral chamber or fore bay precisely as in defendant's construction.

In this connection, the following language of the patent may be noted: "It is apparent that the form, "place and details of construction of the sluice for re- "lieving the gates from excessive pressure below can be "varied by the skilled constructor, but in all cases an "open channel will be necessary *when the water has* "*reached a certain height or pressure under the gates.*"

The distinguishing feature of Kirk's invention is prominent in defendant's construction, and both alike

differ from the prior state of the art. In prior devices the overflow extends from the upper pool and not from the chamber under the gates; in Kirk's device, and in that of Du Bois, the dam is relieved of pressure by an open or relieving sluice draining water from under the gates and not from the upper pool.

It is further contended on part of the appellant that his device does not infringe the patent because of differences in the location of parts from the location of the same or equivalent parts in the patented device. It is well settled, however, that mere change in location or construction of parts, without change in their function or in the result produced, does not avoid infringement.

Comparing defendant's device with the device claimed in the patent, we find every element or its full equivalent. If the changed elements perform the same functions as the corresponding parts of the patent, and in substantially the same way, the difference in their form or location is not efficient to relieve from infringement.

In the case of *Union Paper Bag Co. vs. Murphy*, 97 U. S., 125, Mr. Justice CLIFFORD said :

" Authorities concur that the substantial equivalent " of a thing, in the sense of the patent law, is the same " as the thing itself, so that if two devices do the same " work in substantially the same way, and accomplish " substantially the same result, they are the same, " *even though they differ in name, form or shape.*"

In *Winans vs. Denmead*, 15 How., 549, the Court say :

" It is generally true when a patentee describes a " machine, and then claims it as described, that he is " understood to intend to claim, and does by law actually

" cover, not only the precise forms he has described, " but all other forms which embody his invention ; it " being a familiar rule that to copy a principle or mode " of operation described is an infringement, *though* " *such copy should be totally unlike the original in form* " *or proportions.*"

The authorities are clear that a mere change in position does not relieve a device from infringement if the function remain the same.

Hoyt vs. Horne, 145 U. S., 308.
Safety Valve Co. vs. Steam Gauge Co., 113 U. S., 157.
Western Electric Co. vs. La Rue, 139 U. S., 606.

In the case of *Safety Valve Co. vs. Steam Gauge Co.*, *supra*, Mr. Justice BLATCHFORD said :

" In the defendants' valve, the huddling chamber is " at the centre instead of the circumference, and is at the " seat of the valve under the head, instead of in the head, " and the stricture, instead of being at the circumference " of the head, is at the circumference of the seat of the " valve. But this is only the use of means equivalent to " those shown by Richardson, while the mode of opera- " tion of the parts of the mechanism is the same in their " relation to each other, and the result is the same."

Alleged Invalidity of the Patented Invention.

In appellant's brief the following defenses are urged against the validity of the patent in suit.

1. Anticipation by John Du Bois' Patents Nos. 251,771 and 229,682.

2. Anticipation by the common waste weirs of reservoirs and saw mills.

3. Anticipation by the practice of setting the wickets of bear-trap dams.

4. Inutility and frivolity of the patented device.

We shall consider these defenses in the order stated above.

PATENT OF JOHN DU BOIS, NO. 251,771, DATED JANUARY 3, 1882.

Our answer to this patent is that, although granted some months earlier than the patent in suit, it was for an invention made at a date later than Kirk's invention, the application was filed November 11, 1881 (Rec., p. 244, p. 248), after May 31, 1881, the date of filing the application for the patent in suit (Rec., p. 233), and that its specification recognizes Kirk as the holder of the broad claim to which Du Bois' claim is merely subsidiary.

The history of this patent of Du Bois is somewhat peculiar. As stated above, Kirk, the appellee, conceived his invention and explained it to others in December, 1879, and a month later described it in a paper which is printed on page 205 of the Record, and which was designed to be used as a caveat specification (N. G. Ayres, Rec., p. 130). From time to time after Kirk's first disclosure of the invention in December, 1879, he solicited Du Bois to take it up with him. He says (Rec., p. 167, Q. 7):

"I explained it to him [Du Bois] first in my office in "the early part of 1880, and many times afterwards. "I urged him to adopt it on some dams that he was "building. He persistently disapproved of it, because "he said it wasn't necessary, as his third leaf answered "every purpose."

In April, 1881, Kirk visited again the town of Du Bois and learned that Du Bois had filed on April 19, 1881, an application for the invention which Kirk had described to him (Rec., p. 174 and p. 207). Kirk says (Rec., p. 167, Q. 14):

"I became angry at his duplicity and made applica-
" tion for a patent. As soon as I discovered that he
" [Du Bois] was making application for a patent for
" my invention, I telegraphed the Patent Office to with-
" hold action on his application, and as soon as I could
" I got my attorneys to prepare the papers and filed my
" application. The Patent Office declared an interfer-
" ence in which I was successful."

The interference here mentioned by Kirk was declared on July 22, 1881 (Rec., p. 214), and the issue or recital of the invention which was adjudged to be common to both applications was thus stated by the Commissioner of Patents (Rec., p. 214):

" In combination with a flexible dam or gate, having
" means for conducting and maintaining water there-
" under, an elevated overflow or discharge to limit the
" head of water passing beneath the dam."

This issue was stated by the Commissioner to be Du Bois' first claim, and to be the substance of Kirk's ninth claim, which was the same as claim 6 of the patent in suit (Rec., p. 232).

The overflow device illustrated in Du Bois' application was the same as the device for the use of which he is here charged with infringement of the patent in suit.

Under the rules of practice of the Patent Office the parties to an interference are required to file sworn preliminary statements giving the earliest dates which they can prove concerning their respective inventions, and in the taking of proofs they are held strictly to the

dates therein alleged. It was, therefore, the interest of Du Bois to carry back the date of conception of his invention as far as possible. He said in his preliminary statement, under date of October 17, 1881 (Rec., p. 220) :

" That he [Du Bois] conceived the peculiar construc-
" tion represented in his drawing for controlling and
" adjusting the level or head of the water previous to
" its passage beneath the dam during the winter of
" 1880 and 1881, as he believes on or before the 1st
" day of December, 1880 ; that he described the same
" to others as early as the 15th day of January, 1881 ;
" that as yet he has made no model, *and has built no*
" *dam similar to that shown in his pending case.*"

This paragraph of the preliminary statement is preceded by an indefinite statement that Du Bois had conceived the idea of delivering water beneath bear-trap dams through a channel open at the top, permitting water to escape and relieve the dam, when the head rose above its proper limit, over two years before. Reference was doubtless here made to the old construc- of bear-trap dams with a fore-bay from which the water could not overflow until it also overflowed at the same level from the upper pool, but at all events, it was not the invention in controversy, for in the next following paragraph of his preliminary statement, quoted above, he goes on to refer to the present invention as a different and subsequent one.

These recitals of the preliminary statement seem to prove beyond question that Du Bois' device was anticipated by the invention of Kirk, and the fact of the declaration of the interference shows that, in the mind of the Commissioner, the apparatus of both parties were in substance the same.

Testimony was taken by Kirk in support of the averments of his preliminary statement (Rec., p. 223), and on February 11, 1882, after argument, the Examiner of Interferences decided Kirk to be the prior inventor, saying, in his opinion (Rec., p. 222):

"Du Bois, having filed no testimony, must be restricted to his record date. It is clearly proved, in behalf of Kirk, that he conceived and disclosed to others the invention in dispute as early as January, 1880, and was diligent in filing his application. Arthur Kirk must, therefore, be adjudged the prior inventor."

Meanwhile, on November 11, 1881, Du Bois filed a second patent application, describing the same subject matter as his application which was in interference, but he limited the claims so that they should cover only the location of the relieving overflow in the wall of the fore-bay, and elaborated an ingenious but unsound theory as to the manner of operation of the overflow when so placed (Rec., pp. 247, 248). The application was filed at a time when a practice of great liberality in granting patents prevailed among the Patent Office Examiners, and the application was allowed, but before allowing it the Examiner required that the claim which was in interference be acknowledged and disclaimed. Du Bois accordingly inserted a disclaimer (Rec., p. 248), which now appears in the specification of the Patent No. 251,771, granted in pursuance of this second application, and which clearly stamps that patent as being subsidiary to and covered by the broader claim awarded to Kirk, the sixth claim of the patent in suit, and as thus occupying to that patent the same relation as that explained by this Court in *Cantrell vs. Wallick*, 117 U. S., 695. The disclaimer reads as follows (Rec., pp. 248, 269):

"I do not claim broadly herein the combination, with a flexible dam or gate, of an overflow by which the water can escape after reaching a fixed limit of elevation, the same constituting the subject matter of a prior application."

Notwithstanding the admission of John Du Bois' preliminary statement, and the decision of the Patent Office in favor of Kirk, the answer in this suit avers invention and use by John Du Bois of the patented improvement, or of that form of it which the defendant has used, prior to the invention by Kirk, and a large volume of testimony was taken by defendant to show that prior to December, 1879, John Du Bois had in use the very overflow device whose use is here complained of, and which was described in his patent application above mentioned. His Honor Judge McKennan said in disposing of this branch of the case:

"In the spring of 1881, John Du Bois and Arthur
"Kirk each filed applications in the Patent Office for
"an improvement in bear-trap dams, as described in
"the claim in controversy here. They were adjudged
"to interfere with each other and an interference was
"accordingly declared between Kirk and Du Bois.
"After the taking of testimony and the hearing of the
"parties, the examiner of interferences decided 'the
"'question of priority of invention in favor of Kirk.'
"From this decision Du Bois, in writing, waived his
"right of appeal. Now, although this decision was not
"conclusive against Du Bois, yet the decision itself,
"coupled with his acquiescence in it, is strongly per-
"suasive that it was right. But one averment of de-
"cisive significance is made in the preliminary state-
"ment by Du Bois filed in pursuance of the require-
"ment of the office. In that he says 'that as yet
"'(October 10, 1881) he has made no model and has
"'built no dam similar to that shown in his pending

" ' case.' How, then, is it credible that the contested " invention could have been embodied in the Chamber " of Commerce dam as early as December 23, 1879? " In view of all this, we must conclude that the testi- " mony in behalf of the defendant is of the most " doubtful character, and that the weight of all of it " is with the complainant, and that this part of the " defense must fail."

It has, however, been recently decided that the action of the Patent Office in cases of interference is binding on the parties thereto, especially when no appeal is taken by the defeated party.

Fassett vs. Ewart Manfg. Co., 58 Fed. Rep., 360; affirmed by Circuit Court of Appeals, 62 Fed. Rep., 404.

And in the recent case of Morgan vs. Daniels, 153 U. S., pp. 120-125, this Court said:

" Upon principle and authority, therefore, it must be " laid down as a rule that, where the question decided " in the Patent Office is one between contesting parties " as to priority of invention, the decision there made " must be accepted as controlling upon that question of " fact in any subsequent suit between the same parties, " unless the contrary is established by testimony which " in character and amount carries thorough conviction. " Tested by that rule, the solution of this controversy " is not difficult. Indeed, the variety of opinion ex- " pressed by the different officers who have examined " this testimony is persuasive that the question of pri- " ority is doubtful, and, if doubtful, the decision of " the Patent Office must control."

John E. Du Bois, the appellant, is confessedly privy in title to John Du Bois, from whom he acquired the Du Bois Patents and the infringing dams.

Whatever weight the decision of the Patent Office

would have had against him on the question of the patentable character of the invention in controversy, the identity of the devices of Du Bois and Kirk, and the prior right of Kirk, it will have the same weight as against John E. Du Bois, his privy. And the interference proceedings should at least have weight to this extent: It is *prima facie*, if not conclusive, evidence that Kirk is the prior inventor, and that there was an interference between the claims of the respective parties. It also raises a strong presumption that a device which both parties deemed worthy of a patent application, and the merits of which both commended in their specifications, is neither frivolous nor useless, and that the invention is substantially different from prior devices which were well known to both parties. It should also cast suspicion upon any argument now advanced by the defeated party seeking to contradict his former solemn representations and to belittle the importance of the invention which he has failed to secure.

These considerations, we think, sufficiently dispose of the Du Bois Patent No. 251,777.

The Du Bois Patent No. 229,682, Dated July 6, 1880.

This patent is printed on pages 253–260 of the record. The summary of its specification contained in appellant's brief is, in some respects, inaccurate. The proposition that it anticipates or limits the invention of the patent in suit is now raised for the first time. It was not suggested to the Court below, and defendant's expert witness Reese does not even notice it. There is no statement in the testimony that the apparatus which it describes accomplishes the same result or works in the

same way as the invention of Kirk; indeed, the witnesses do not mention it at all. The patent relates to a dam and system of locks for navigable rivers. The dam is of the bear-trap type and extends entirely across the stream, except that at the side there is a lock for the passage of boats, the gates at the ends of the lock being constituted by small bear-trap dams. To prevent the undue rise or washing away of these gates, the patent suggests hinging together of the leaves at their apex, and providing the lower leaf at its base with a sliding block connecting it to the foundation, also the use of chains, rings sliding upon rods, "or "other devices," all designed to resist the hydrostatic pressure, the occurrence and danger of which are suggested by the statement of the specification that "it is necessary that the hinges of the dam "sections, and also the hinges of the lock-gates shall be "very strong" (Rec., p. 256). Concerning the regulation of the elevation of the small bear-trap gates in the lock, the patentee says (Rec., p. 254) that "the elevation of the gates is effected by admitting and confining "water beneath them, and the degree of elevation is controlled and limited by regulating the admission and "discharge of the water, or by permitting the free admission of the water and regulating the rate of discharge."

Here there is described merely the old method of controlling the gates by manipulation of the wickets by a gate-tender whose duty it is to stand by the wickets and to keep them in proper adjustment—a feasible method, but one which requires the presence of an operative—not an automatic device, and, therefore, not the device of the patent in suit. It is this practice of tending the wickets to which the appellee

Kirk refers in his testimony given before the Master, which is quoted by appellant on page 30 of his brief. He does not state that it is possible to adjust the wickets in set position and thus permanently hold the dam at any given height, as appellant seems to understand him (see Rec., p. 303, Re-d. Q. 174).

The patentee also describes means for regulating the elevation of the main dam "according to the height of "the stream," so that when the stream is high the dam may fall correspondingly and drain away the water from the upper pool. To do this he places a float, not in the fore-bay, but "*in the stream above the dam*," and connects it with the wickets by a rack and pinion. Obviously, this is not Kirk's idea. Du Bois automatically *varies the height* of the dam in accordance with variations of the level of water in the upper pool. He lowers the dam and drains off the water from the upper pool when needed. Kirk does not vary the height of his dam at all. He merely relieves it of pressure; the dam when raised is always at the same elevation. Furthermore, Du Bois effects his regulation by operation of the level of water in the upper pool, and, as a consequence of such regulation, must lower the dam and drain off the water of the stream itself. Kirk's relieving device is independent of the water level in the upper pool, it drains no water therefrom, and its essential characteristic is that it operates by virtue of the common water level in the fore-bay and dam chamber. The devices have different purposes—the means they employ are different.

On the accounting, where testimony concerning the use of floats was first introduced into the case, the Master found in his report (Rec., p. 459) that

"As to the use of floats as a means of regulating "the wickets and controlling the pressure of the water "under the leaves, the evidence as to their practical "use and operation was so indefinite that the Master "will dismiss the subject without further comment."

Is Kirk's device anticipated by prior use of waste weirs of reservoirs and saw mills?

In making his proofs in support of the answer, defendant introduced no evidence on this subject. He relies upon evidence introduced at the accounting, and upon the common knowledge of the Court.

But there is no real analogy between such devices and Kirk's. All stationary dams and reservoirs have overflow sluices and waste weirs, which drain the water from the pool or reservoir itself. This is exactly what Kirk does not do. As we have shown, he establishes an overflow in a special chamber or forebay, and by means thereof maintains automatically a constantly lower level in the forebay than in the upper pool. To drain the upper pool itself as in stationary dams is wasteful and would not accomplish the object which Kirk seeks. Appellant's argument in this regard involves a misconception of the Kirk invention. To locate a waste or overflow in the dam above the forebay would not give the result which is produced by the overflow "extending from under the gates," which is characteristic of the device of the patent in suit.

The contention of the appellant is that the construction of the patent in suit is a waste weir and nothing more, and that a waste weir is an old and well-known device which every one has a right to use, because it has been used from time immemorial. This argument is utterly fallacious. A waste weir is correctly defined in

the Century Dictionary to be "a cut made through the side of a canal, reservoir, &c., for carrying off surplus water." The definitions quoted in appellant's brief are substantially the same, but special stress is laid on the quotation from Rankine's book on steam engines, &c., in which he says that by such device "any flow of "water which is in excess of that required for the "stream, and which there is not reservoir room to store, "is discharged into the natural channels of the country. "This generally commences with a weir or overfall "forming part of the boundary of a reservoir, and of "such length that the greatest possible flow of waste "water can escape over it without rising to a dangerous "or inconvenient height."

This statement is correct and serves to show the fallacy of appellant's position. Neither the Kirk device nor that used by the appellant, which we claim to be an infringement, could possibly perform the function of a waste weir, and a waste weir could not possibly perform the function of the Kirk device until all of the upper pool of the dam had been drained down to a point below the comb or highest point of the bear-trap dam, long before which time the bear-trap dam might be swept away by the unrelieved pressure of the upper pool. Besides this, in cases of small streams, especially those subject to sudden floods, the effect of a waste weir low enough to relieve a bear-trap dam, would be to drain the pool and to waste water, which would be a serious loss.

Even if this were not so, the waste cannot be held to anticipate the Kirk Patent, because it is a different device, having a different function, and is not, as Kirk's is, a part of a bear-trap dam, nor placed in operative continuation therewith.

But appellant seeks to prove this proposition by reference to a statement made by Mr. Kirk in his testimony before the Master on the accounting, in which he states that as far as he knows the practice of diminishing the height of water in dams by opening of waste ways and the removal of brackets is a very ancient and well-known one.

We shall insist that, for reasons hereinafter stated, the testimony taken in the accounting should not be considered in the present appeal to invalidate the patent in suit or for any other purpose, nevertheless we think it be best to reply to the use thus made of it in this instance, as we do not wish it to be supposed that we consider this portion of the record as injurious to our case, but object to it solely because we suppose it to be incompetent.

Mr. Kirk states that the opening of waste ways to diminish *the height of water in dams* was well known. That he does not mean to be understood that the opening of a water way from the interior of a bear-trap dam was old and well known, as he distinctly states in reply to questions 38 and 40 of the same examination. (Record, p. 286–7).

Is Kirk's device anticipated by the prior practice of regulating bear-trap dams by means of the wickets?

In the progress of the accounting, and then for the first time, defendant introduced evidence tending to show the existence of certain dams built in the Lehigh River between the years 1840 and 1850. We contend that this testimony should not be considered on this appeal for reasons hereinafter stated. The leaves of

each of these dams were provided with stops or cleats to limit their ascent, and were made of such length that when elevated they projected from the surface of the water two feet above the comb of the stationary dam which extended across the river from the side of the bear-trap, so that the water did not and could not flow over the leaves. Hence the dam could not rise so far as to permit the lower leaf to be forced out from the upper one, but the pressure was relieved, not by an overflow in the fore-bay, but by draining the water from the upper pool itself over the comb of the stationary dam. The water in the chamber under the bear-trap leaves and the water in the pool were necessarily at thes ame height, not at different levels as in Kirk's device (Woodward, Rec., p. 350, Q. 294; Evans, Rec., p. 351, Q. 307; p. 352, x-Q. 312). Furthermore, this arrangement of the dam leaves would obviously present objections when the dam is employed otherwise than under special circumstances. It requires that the leaves be made unduly long so that when raised they shall always project above the surface of the water, and that the water cannot flow over their crest. It is easy to see that under such circumstances the projecting bear-trap leaves would afford a constant obstruction, liable to catch drift-wood, logs, ice and other floating debris of the stream.

Some of the defendant's witnesses on the accounting testify that it was possible to regulate the height of the Lehigh dam at any point by adjusting or cocking the wickets and leaving them set in proper relative position. It is difficut to understand how such nice adjustment as this would involve is possible. The pratice was not necessary where, as in the Lehigh dam, the

stationary embankment was below the level of the gates and where the water could flow freely from the upper pool over the embankment, and its existence is denied by complainant's witnesses (Hayes, Rec., p. 394; Childs, p. 397; Nogle, Rec., p. 398, and Blakeslee, Rec., p. 400). But however that may be, there is nothing in this practice at all resembling the Kirk invention.

The suggestion in appellant's brief, that in one of the Lehigh dams, where the leaves projected above the water and above the level of the stationary dam or embankment, the water must have flowed out through the triangular opening thus exposed at the apex of the dam-chamber, is of no force, because in that case the water had the same level in the pool and in the dam-chamber, and it could run from the latter merely as a part of the waste which discharged over the embankment, and in no sense could be said to relieve the dam. The relief was accomplished by draining the upper pool.

Alleged Inutility of Kirk's Invention.

Appellant argues that the Kirk invention is useless and frivolous. The argument is based mainly on the fact that only nominal damages were awarded to the complainant as a result of the accounting. But it should be noted that the Master refused substantial damages solely on the ground that complainant's evidence was too conjectural; that in its application to dams of such small size as those used by the defendant, the invention was not proved to have resulted in a money saving, and that it is possible on defendant's small dams to resist successfully the hydrostatic

pressure on the leaves by cleats and stops. The Master says (Rec., p. 454):

"The findings and conclusions of the Master, as far "as this accounting is concerned, apply only to the "small dams on defendant's property, used for logging "operations, and would have no bearing to relieving "devices or methods when applied to large dams on "the large navigable streams and used for navigable "purposes."

Furthermore, it hardly lies in defendant's mouth to assert inutility of a device which he has extensively used, for which he applied for a patent, and which his witnesses commended without reserve, until the reference to a Master made it to his interest to deny to it the merit of practical value.

The statement of appellant's brief, page 36, that eight of appellant's fifteen dams "had all the sides of "the forebay of equal height," which, it is argued, indicates frivolity in Kirk's device, is misleading, for it appears from the testimony that they were not used as bear-trap dams, but were boarded up and used as splash dams or as stationary dams (J. E. Du Bois, Rec., p. 283, Qs. 19–22, 23, and p. 285, Qs. 32–35).

Alleged Lack of Patentable Invention.

It is contended by appellant that the patented device does not involve invention, that it is an obvious expedient, and that the patent is void on account of the simplicity of the device. There is little merit in such contention, even were it not inconsistent with the application for letters patent made by DuBois for this same invention which it is now attempted to belittle.

Where a meritorious end is accomplished for the first time the simplicity of the device is an argument in favor of its patentability, for it is notorious that the highest degree of talent is often exercised in reducing to a minimum the number of mechanical appliances used in accomplishing a given result. This is a well-settled doctrine, asserted time and again by this Court. In the case of the *Barbed Wire Patent* a second wire had been suggested in a former patent, yet the use of such wire to accomplish a meritorious end was held to be patentable (143 U. S., 283). In the case of *Western Electric Co. vs. LaRue*, 139 U. S., 601, the inventor merely substituted a torsional spring which was old *per se* for a flat spring or coil spring in telegraphic instruments which were also old, yet this Court held that this substitution involved invention, and also that defendant's denial of the utility of the patented device was inconsistent with its action in regard to a device patented by one of its employees in which this torsional spring was an element.

In the case of *Krementz vs. Cottle*, 148 U. S., 556, a parallel case with this, in that it was a contest between rival inventors, the patented invention consisted in a collar button stamped from a single piece of metal. Other articles had been so formed and the process was not new, yet this Court held that a meritorious result was attained for the first time, and that this simple device involved patentable invention; and, further, that the contention that the step in the art was an obvious one was negatived by the action of the defendant in himself taking out a patent for an invention which lessened the number of parts of which the collar button was composed.

This question as to invention and the simplicity of

device is fully considered in the recent case of Potts vs. Creager, 70 O. G., 498, in which this Court considers the leading cases on this point and says:

"The apparent simplicity of a new device often "leads an inexperienced person to think that it would "have occurred to any one familiar with the subject; "but the decisive answer is that, with dozens and "perhaps hundreds of others laboring in the same field, "it had never occurred to any one before. The prac-"ticed eye of an ordinary mechanic may be safely "trusted to see what ought to be apparent to every "one."

In the case at bar Du Bois was thoroughly conversant with the art, and he himself applied the prescribed test and placed the device within the bounds of patentable invention by making application for a patent for the patented invention and in contesting Kirk's right thereto.

In the case of *Lehnbeuter vs. Holthaus*, 105 U. S., 97, the Court says:

"The fact that it [the patented device] has been "infringed by defendants is sufficient to establish its "utility, at least, as against them."

As Judge COXE says in *Beach vs. Am. Box Machine Co.*, 63 F. R., 597-602:

"Infinitely less were the changes required in sub-"stituting a wire barb for one cut from an iron "plate; in placing a rubber back upon the packing "for stuffing boxes; in substituting a torsional spring "for curled or flat springs in a telegraph key; and in "substituting hard rubber in lieu of materials previously "used for a plate for holding artificial teeth. And yet "the Supreme Court has decided that to do these things "required invention (Barb Wire Case, 143 U. S., 275; "Magowan vs. Packing Co., 141 U. S., 332; Electric Co.

" vs. La Rue, 139 U. S., 601 ; Smith vs. Vulcanite Co., " 93 U. S., 486)."

As to Costs and Non-admissibility of Record of Proceedings Before the Master.

The first and second assignments of error have reference exclusively to the costs in the suit, as follows :

1. The Court erred in not entering decree in favor of the defendant for costs which accrued after the interlocutory decree.

2. The Court erred in not entering decree in favor of the defendant for all costs.

The appellant has cited no authority, nor made any argument in his brief in support of the second assignment. If the Court below was right in awarding a decree in favor of complainant on the issues of validity and infringement of the patent in suit, it certainly was correct in awarding to him his costs, at any rate, up to the date of the interlocutory decree. This was done in the cases cited by appellant in support of the first assignment of error.

The question remains, as to the first assignment, whether, where a decree is entered in favor of complainant on the questions of validity and infringement, with only nominal damages, the complainant must be decreed to pay all costs accruing after the interlocutory decree. So the appellant contends, and cites as authority the cases of *Dobson vs. Hartford Carpet Co.*, 114 U. S., 439–444, and *Dobson vs. Dornan*, 118 U. S., 10–18, which are both on the same patent.

There is, however, this essential difference between the cited cases and the case at bar. In both of the Dornan cases there was a decree below in favor of the complainant awarding a money recovery of a considerable sum. On appeal to this Court by the defendant the decree was reversed, and, notwithstanding this, costs were allowed to the complainant to and including the interlocutory decree.

In the case at bar the decree in the Court below was in favor of complainant, but with only nominal damages, so that, if this Court sustains the interlocutory decree, there is no question left but that of costs. The costs were divided in the Dornan cases, although the final decrees were reversed, because of the money decree for profits in favor of the complainant, but in the present case, if the decree of the Court below is sustained on all the questions at issue, validity, infringement and profits, then there can, we submit, be no reversal, because the only question left would be that of costs, and there is nothing in the present case to induce this Court to depart from the firmly established rule not to reverse on a question of costs, following the decision of this Court in the case of *Canter vs. Insurance Co.*, 3 Peters, 307, based upon the principle laid down in that case by Justice STORY that "costs are "allowed in the exercise of a sound discretion by the "Court, and, besides, it may be added, that no appeal "lies from a mere decree respecting costs and ex-"penses."

This case was followed in *Elastic Fabric Co. vs. Smith*, 100 U. S., 110-112, where this Court said: "As "no appeal lies from a mere decree respecting costs "and expenses, and this case comes within the reason "of that rule, we affirm the decree without examining

" the merits." And in the *Paper Bag Machine Cases*, 105 U. S., 766–772, this Court says: " So far as the " appeal of Thomas Nixon is concerned the controversy " is really as to costs alone. The decree against him " will, consequently, not be considered."

In the present case if the decree of the Court below is sustained as to validity and infringement of the patent in suit, the controversy would only apply to costs. If on the other hand, that decree is reversed the costs will follow the judgment of this Court, and the first and second assignments of error need not be considered.

As the imposition of costs is a matter resting in the discretion of the Court below, there is a further reason for not reversing the judgment of that Court as to costs, on the well-settled principle that the exercise of judicial discretion is not reviewable in a court of appeal. Undoubtedly this matter of costs, in case of recovery of nominal damages, is a matter of judicial discretion, depending upon the peculiar circumstances of the case, as to which the Master before whom the witnesses are examined orally, and the Court below, hearing the case more fully and in detail than is usually possible in this Court, are better able to decide. When the patent is valid and the defendant has infringed and a reference is ordered by the Court the costs of the reference as well as the proceedings before the interlocutory decree are all caused by the wrongful act of infringement of which the defendant is guilty, and it is just that they should be borne by him. The remarks of the Court in the case of *Calkins vs. Bertrand*, 8 Fed. Rep., 761, on this question are extremely pertinent.

See, also,

Glendale Co. vs. Smith, 100 U. S., 110–111.

Paper Bag Machine Case, 105 U. S., 766–772.
Canter vs. Insurance Co., 3 Pet., 307–319.
Wright vs. Hollingsworth, 1 Pet., 165–168.

The facts stated in the opinion of the Court below show that the appellant has not acted fairly to the appellee; that with full knowledge of the appellee's prior rights, and notwithstanding the decision of the Patent Office in the interference proceedings, he persisted in using the patented invention, defended his right to do so by unconscionable defenses of prior use, and subjected appellee to the expense of protracted litigation, asserting until the ~~final~~ interlocutory decree the merit and value of the invention in controversy, and then suddenly changing front upon this point. We submit that under these circumstances the decision of Judge BLODGETT in *Calkins vs. Bertrand*, above cited, is in point, and that the Master and the Circuit Court were right in imposing the costs upon the appellant.

As there is no appeal from that part of the decree in this case which awards nominal damages only to the appellee, we submit that the Master's Report and the evidence in the accounting are irrelevant and should not be considered by this Court, nor form the basis of any argument on either side in this case. This matter covers from page 280 to page 471 of the record, both inclusive, and if our position on this point is correct, it excludes from consideration those portions of appellant's brief relating to the use of floats and waste weirs, the bear-trap dams used on the Lehigh River, and the many citations made in that brief from the testimony of witnesses examined before the Master.

A conclusive reason, as we conceive, for excluding all of this testimony and evidence taken before the Mas-

ter on accounting, after the rendering of the interlocutory decree is found in the opinion of his Honor Judge ACHESON in rendering the final decree (Rec., p. 466), as follows:

"The views of the Court upon the case as then presented [*i. e.*, upon the hearing which resulted in the interlocutory decree] are distinctly set forth in the opinion of Judge MCKENNAN, 33 Fed. Rep., 252. No reason is perceived for doubting the soundness of that opinion, but our former decree is not now regularly open to review, even were it conceded (as the defendant earnestly contends) that new proofs were adduced before the Master upon the accounting which impugn the right of the plaintiff to maintain his bill. For, if the defendant desired to reopen the question heretofore passed on by the Court, it was his business to apply for a rehearing which, if granted at all, would have been upon terms securing to the plaintiff an opportunity for putting in additional rebutting evidence."

No rehearing having been granted or even asked for by the defendant after the coming in of the Master's report, the new testimony taken before the Master on the merits (other than that relating to the question of damages and profits) was thus expressly excluded from the consideration of the Court below in rendering its final decree; and, no exception having been taken in this Court to the refusal of the Court below to consider this new testimony on the question of validity or infringement, it ought not, we submit, to be referred to by counsel or considered by this Court. The testimony as to the prior state of the art, given before the Master, was relevant only for the purpose of controverting complainant's claim as to the relative money value of the patented invention. It was not proper to be con-

sidered for the purpose of attacking the validity of the patent or limiting its scope. Complainant would not have been permitted by the Master to answer it by testimony showing the substantial differences between the patented invention and the prior uses. Therefore, to consider the testimony in this court as affecting the merits of the patent would be, in effect, to hear one party only on a point as to which the other party has never had an opportunity to examine witnesses (*Thomson vs. Wooster*, 114 U. S., 104, 114). In the case just cited the Court, by Mr. Justice BRADLEY, say :

"The attempt on the hearing before the Master to "show that the reissued patent was for a different "invention from that described in the original patent, "or to show that there was such unreasonable delay "in applying for it as to render it void under the "recent decisions of this Court, was entirely inad- "missible, because repugnant to the decree. The "defendant could not be allowed to question the "validity of the patent which the decree had de- "clared valid. The fact that the reissue was applied "for and granted fourteen years after the date of "the original patent, would undoubtedly, had the "cause been defended and the validity of the reissued "patent been controverted, have been strongly pre- "sumptive of unreasonable delay ; but it might possibly "have been explained, and the Court could not say as "matter of law, and certainly under the decree of the "Court, the Master could not say that it was in- "susceptible of explanation."

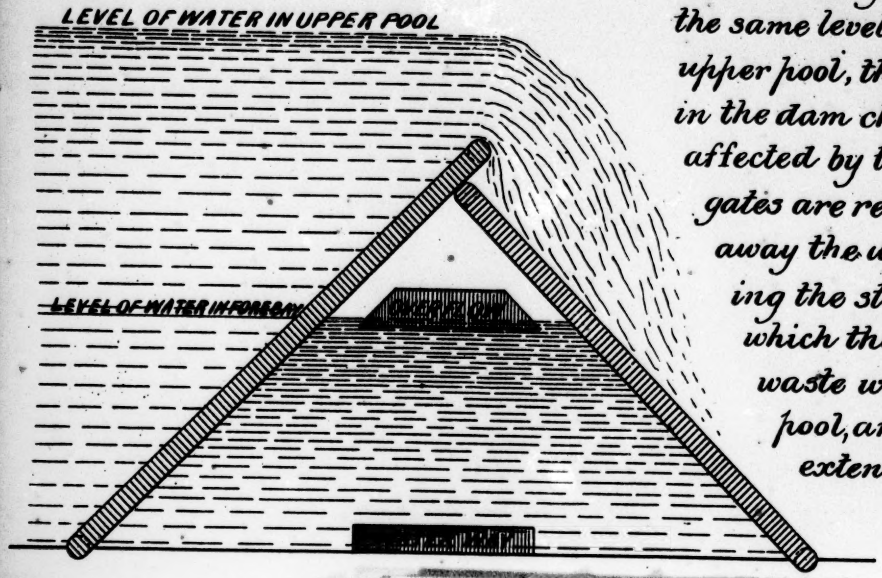
Furthermore, as to any other portions of the testimony taken before the Master, we submit that they also must be excluded, because there is no appeal pending as to the award of merely nominal damages or any other matter passed upon by the Master.

In conclusion we submit that, in view of all the evidence, the sixth claim of the patent is for a new and patentable invention; that it has been infringed by the defendant; and that the decree of the Circuit Court should therefore be affirmed.

Respectfully submitted,

THOMAS W. BAKEWELL,
JAMES K. BAKEWELL,
WILLIAM BAKEWELL,
For Appellee.

Drawing. No. 3. – illustrating the Kirk invention.



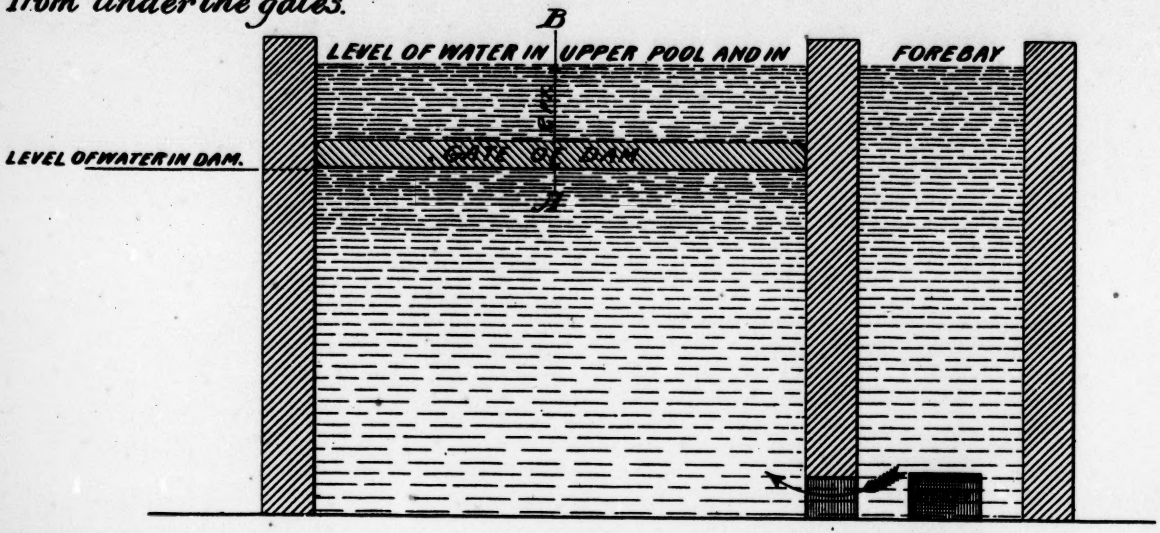
In this plan no matter how great the force of the stream may be, no pressure is exerted on the leaves. They are just balanced.

This is effected by the overflow, which keeps the water in the forebay and in the dam chamber always at the same level and at a lower level than that of the upper pool, the height of the level in the forebay and in the dam chamber being constant and quite unaffected by that of the upper pool. In this way the gates are relieved of pressure without taking away the water from the upper pool and draining the stream as in prior constructions in which the overflow if any was through a waste weir extending from the upper pool, and not as in Kirk's device extending from under the gates.

DRAWING. No. 1. — showing construction prior to Kirkand having closed Forebay.

Water same height in Forebay and in Upper Pool.

Hydrostatic pressure equals pressure of a column of Water of height of A-B x area of lower leaf, and can not be relieved without draining off the whole upper pool at a great waste of water. In Kirk's device, where a secondary or auxiliary operative head of lower level is employed to uphold the gates the dam is relieved without wasting any water from the upper pool. In prior Dams the discharge extends from the Upper Pool. In Kirk's it extends from under the gates.



Drawing No. 2. Showing Prior State of the Art

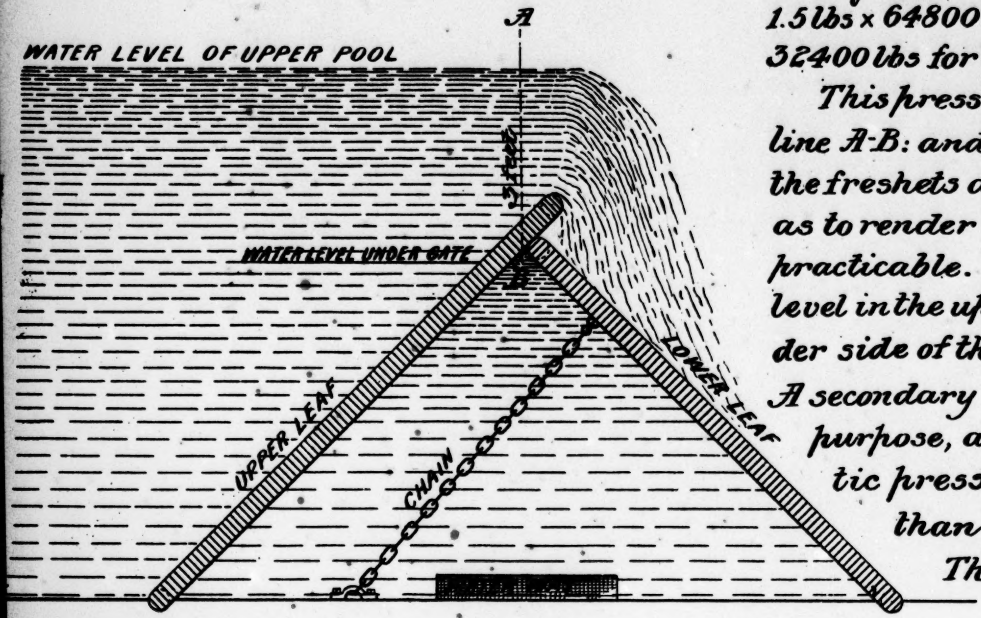


Diagram Sketch showing prior state of the art.

Suppose leaves to be 30'x 15'

Then pressure on leaves - A column of water 3 feet high pressing on the leaves. Area each 450 sq. ft. or 64800 sq. inches.

1.5 lbs x 64800 - 97200 lbs. on the lower leaf or 32400 lbs for each foot of elevation.

This pressure varies with the height of the line A-B: and in mountain countries, when the freshets are large, is apt to be so great as to render the use of Bear Trap Dams impracticable. With Kirk's device the water level in the upper pool does not act on the under side of the gates at all.

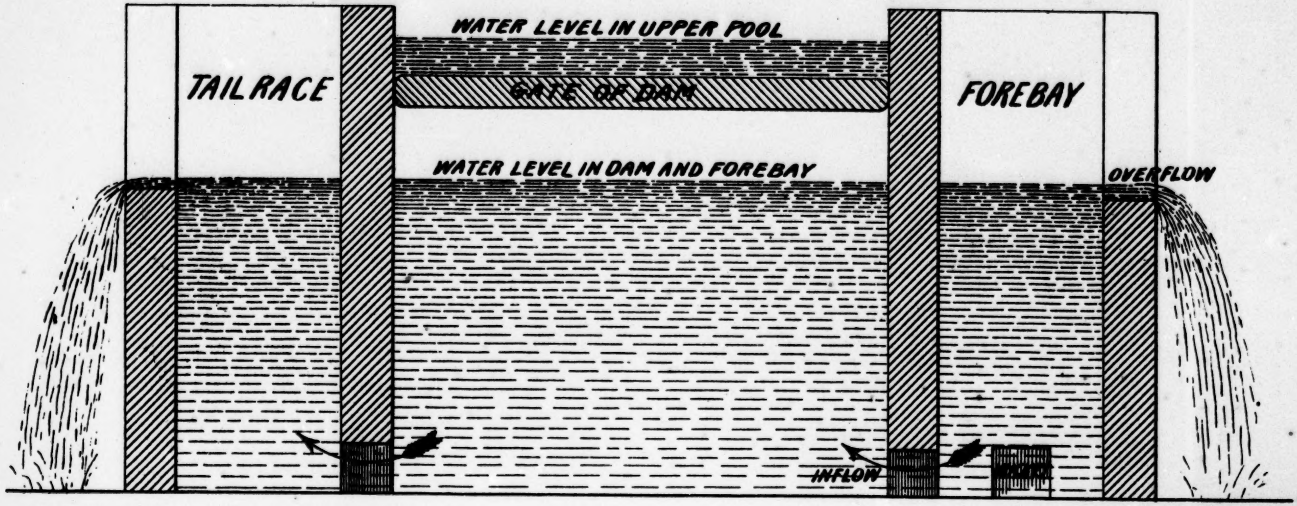
A secondary forebay head is used for this purpose, and the sustaining hydrostatic pressure is no greater in a freshet than in a drought.

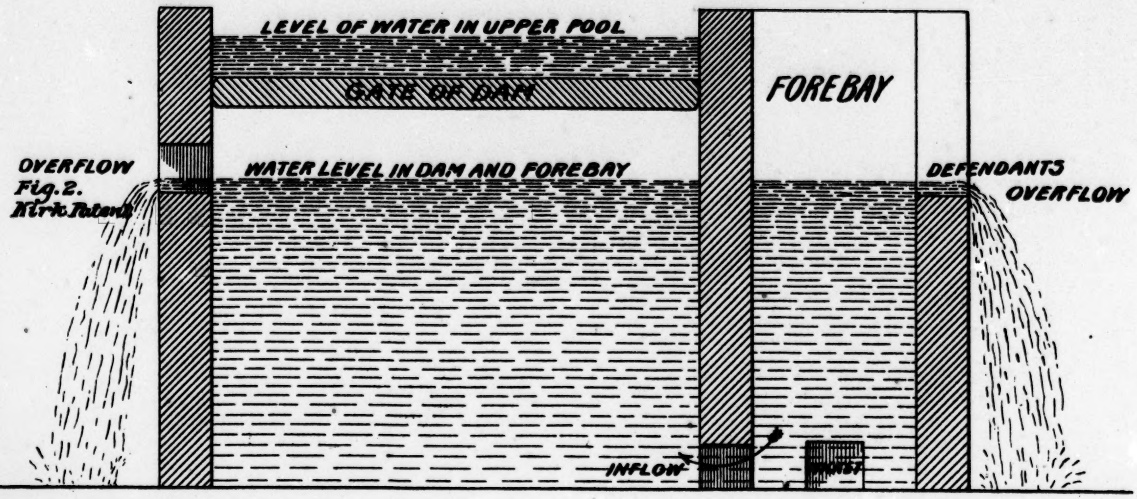
The gates are at all times balanced

DRAWING. No. 4. – illustrating Complainants (FIG. 4.) and Defendants Construction –

Fig. 4. of Kirk as defined by Defendant.

Defendants Construction.



DRAWING No. 5. illustrating Defendants construction and that of Fig. 2. of the Kirk Patent.

In each there is an elevated overflow communicating with the gate chamber, and in each the level of water in the Forebay and in the chamber under the leaves is kept at a constant height, less than and unaffected by the water level of the upper pool.